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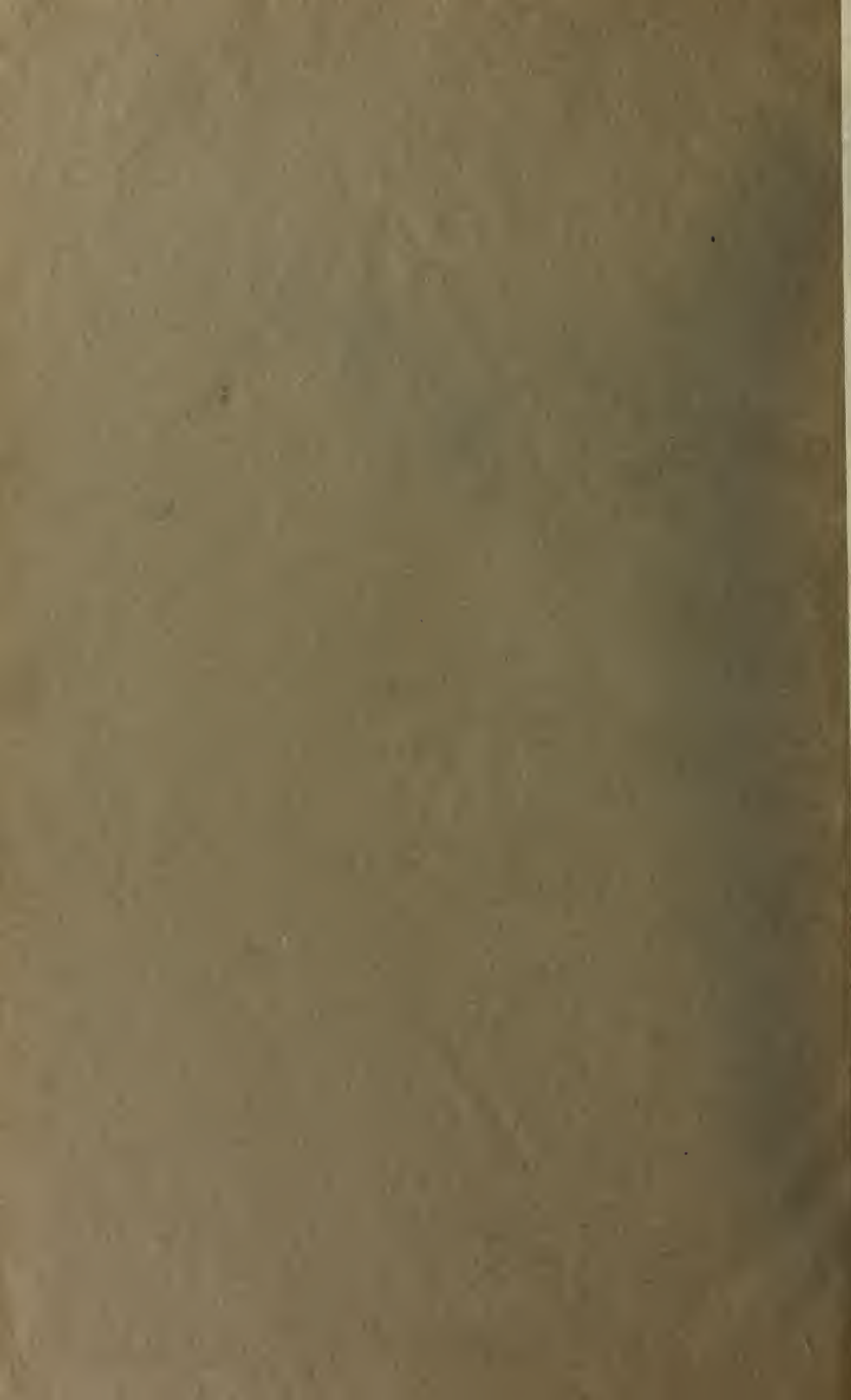
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# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,  
ARTS AND HANDICRAFTS.

Every Second Saturday.

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## TOPICAL TOUCHES.

Subscribers to the IRISH BUILDER are reminded that subscriptions to the paper are now due, and they will oblige the proprietors by remitting.

In this issue we publish the interesting paper read by Mr. Thomas Baird before the Architectural Association, and to which we made reference last issue. Intended primarily for a student audience, it contains much that should be of value to the more mature practitioner.

We reproduce the diagram of the hydraulic ram and the description of its working, without any apology to our readers, because of the admirably clear description that accompanies it in the text, for it is astonishing how many people fail to clearly understand the working of this simple and most useful contrivance.

St. Mary's R.C. Cathedral, Sydney, has been in course of erection since 1866 under the reign of three Archbishops. From the foundation to the completion of the temporary roof involved an outlay of upwards of £100,000. Under the sway of Cardinal Moran another £100,000 has been expended upon it. This includes the cost of the elaborate scheme of internal decoration. The principal dimensions are—Outside length, 350 feet; width, 80 feet; length of transepts, 24 feet; height of towers and spire (not yet completed), 232 feet.

The new offices and premises at New Ross, Co. Wexford, for the Munster and Leinster Bank, Ltd., have just been completed. The front is of chiselled limestone, neatly moulded. A fireproof strong room is constructed in a convenient position in the offices, having one of Chatwood's steel frames, and steel door and grille. The offices are fitted in an up-to-date style, and the sanitary work is all that could be desired. The architect was Mr. Thomas Scully, B.A.B.E.; Mr. P. Costen, of Waterford, was contractor for the works; and Mr. Costello executed the sanitary and plumbing work. Local employment was given as far as was found practicable.

In the paper on road-making, by Mr. P. C. Cowan, published in our last issue, reference is made to Alexander Nimmo, as a great road maker in Ireland, who flourished about 1822. He was sent by the Government of the day to lay out and construct roads and bridges in the south and west of Ireland, a sum of £334,857 having been made up by a Government grant and private subscriptions, to ameliorate the effects of the disastrous famine of 1822. It may be of interest to mention that Nimmo's theodolite, with which he did much of this work, is in existence still in daily use, being a small but wonderfully handy and accurate little instrument, and was used last summer in laying out some of the tunnel work on the Greystones main drainage. It is now the property of David Burtchael, Esq., C.E., of the D.W. and W. Engineering staff, to whom it came from his father, the late Peter Burtchael, Esq., C.E., surveyor of the county of Kilkenny, and engineer of the fine bridge over the Barrow, at New Ross, and other important works. Nimmo's theodolite was lent by Mr. Burtchael to the engineers for the scheme.

Under the auspices of the Department of Technical Education, Dr. Anthony Roche will deliver a course of lectures in the College of Science, Stephen's Green, on Sanitary Science. The course will be suitable for candidates for the position of sanitary inspector, for plumbers and builders, and for others interested in sanitary science and public health; will be open to ladies, and will be illustrated by models and lantern demonstrations.

The fee is fixed at the modest charge of 2s. 6d. for the course of twenty lectures. The first lecture will be held on Saturday, 20th inst., at 8 p.m., and will be continued on the following Tuesdays and Saturdays.

The subjects dealt with will comprise a general introductory lecture, theory and practice of ventilation, soils, sites, and buildings; sewage disposal, food classification, inspection, and disinfection, etc., etc.

During Christmas week Miss Purser had a fine display of examples of her beautiful stained glass in the windows of the "Irish Homestead," in Lincoln place. Miss Purser has shown what can be done by Irish artists in stained glass, and deserves every encouragement. Some modelled work was also shown, and we counted ourselves fortunate in becoming the possessor for the modest sum of one guinea, of a very charming little holy water stoup modelled by Miss Beatrice Emery, one of the rising school of modern Irish art workers, and a lady who has done some very excellent work.

In St. Patrick's Cathedral a very fine memorial to the late Provost of Trinity College, Dr. Salmon, was unveiled the other day by the Dean, Dr. Barnard. The memorial, which was designed by Sir Thomas Drew, LL.D., P.R.H.A., comprises two very fine stained glass windows by Mr. Charles E. Kempe, who is universally acknowledged to be the best artist of the day in stained glass. The windows are illustrative of the life of St. Peter. There is also a portrait medallion in bronze of Dr. Salmon. The paintings are the work of Mr. C. E. Kempe, the medallion being from the hands of Mr. A. Bruce Joy, A.R.A. Beneath the medallion is a bronze tablet which, with the frame of the portrait, was also designed by Sir Thomas Drew.

The tablet bears an inscription in raised letters, referring to the many high distinctions of Dr. Salmon as a Churchman and a scholar. The inscription is the work of Mr. McGill, engraver, Essex quay, the finely modelled cartouche framing being carried out by Messrs. Sharp and Emery, Great Brunswick street.

The Dean spoke a few appropriate words, and referred to the fact that Dr. Salmon's many virtues would also be recorded in other memorials, notably in Trinity College and in a little chapel in the Alps, where his name would be associated with those of the eminent New Testament scholars connected with him—Lightfoot, Westcott, and Hart. Dr. Salmon was a mathematician of European fame, and one of the most notable Irishmen of his day. For centuries past few men have shed more lustre on their Alma Mater, of which he ultimately rose to be Provost, than he. Modest and unassuming he was a truly great man.



The seventh annual International Congress of Architects will be held in London during July next. The arrangements are in the hands of the Royal Institute of British Architects, who have got together a strong committee and an excellent programme of practical, artistic, and general interest has been arranged. Architects desirous of joining the Congress, which promises to be a great success, should apply to the Secretary of the Institute, Conduit Street, London, as soon as possible, in order to facilitate the details of the arrangements. The Lord Mayor of London and other representative men have entered heartily into the project, which promises to be a most successful gathering.

With reference to our mention of the name of Messrs. McCartan and Co's granite, which we described as "Newry" granite, we regret our want of precision has led to some enquiries being addressed to "Messrs. McCartan, Quarry, Newry," whereas their quarries are at Castlewellsan, 23 miles away. Messrs. McCartan maintain that their granites are superior to the Newry granites; that they are better in colour, and take a higher polish than Newry granite. We were well acquainted with Messrs. McCartan's address, but we purposely described their granite as "Newry granite," although it is quarried at Castlewellsan, because the former designation being so well-known. Messrs. McCartan, in common with one or two other firms, are doing their very best to push the Irish granite industry, and they deserve the greatest possible encouragement from Irish architects and engineers.

Mr. Mortimer Menpes, the well-known artist and author, has brought out a new and finely illustrated work on Rembrandt. Mr. Menpes has made a serious study of copying the works of that great artist, and this is how he describes the manner in which it influenced him:

In copying these pictures certain qualities have been revealed to me, which no one could possibly have learnt except by this means. Rembrandt worked, more or less, in two stages—first, by a carefully-painted monochrome, handled in such a way as to give texture as well as drawing, and in which the masses of light and shade are defined in a masterly manner; second, by putting on the rich, golden colour—mostly in the form of glazes, but with a full brush. This method of handling glazes over monochrome has given a gem-like quality to Rembrandt's work, so much so that you might cut out any square inch from any portion of his picture and wear it as a jewel.

#### ARTISTIC STAIR WORK.

##### The Latest Development in Square-cut Newels and Balusters

The square-cut woodwork turned out by Messrs. Jones and Leach, Newtown, North Wales, has achieved the reputation of representing Square Turning at its highest pitch of excellence. Their square-cut newels and balusters are made on a new principle, by which the objections to the Drum system are entirely overcome. By Messrs. Jones and Leach's method the faces are finished perfectly square with clean cut moulds and correct intersection of mitres, and a further advantage is that the newels are made to harmonise in character with the balusters. The firm has, in fact, devoted itself to making a speciality of this class of work, and the unique finish of their goods is the outcome of many years' constant experimenting. We had an opportunity of inspecting their exhibit at the Building Trades' Exhibition in London last May, and have no hesitation in saying that their goods are the best of their kind we have ever seen. Owing to the greatly increased demand for their work, Messrs. Jones and Leach have found it necessary to open a London office and show room at 20 Victoria-street, Westminster, where specimens will be exhibited for inspection. Sample balusters and price lists will be sent to any address free, and special quotations given for large quantities. Architects who so desire it can have the woodwork executed to their own special design, and are certain to secure perfect satisfaction.

#### OUR SOUTHERN LETTER.

(FROM OUR OWN CORRESPONDENT).

##### Railways.

Public interest still runs high in connection with the respective merits of the different schemes for the junction of the railways in Cork. The matter now crops up at nearly every meeting of the Corporation or Harbour Board, the members of which bodies are more or less interested in one or other of the local schemes. Gentlemen may now be heard strongly advocating the junction of the railways who have for years opposed the idea. It must be borne in mind, however, that local discussion will not settle the matter, as the whole question must be fought out in the Committee Room of the House of Commons. The Corporation, without actually approving of any of the schemes, seem to favour that brought forward by the Harbour Board as being the cheapest and least obtrusive, and also will be the means of forming a means of opening up a new thoroughfare from the north to the south side of the city, which will relieve the traffic in King-street, which, since the construction of the tramways, has been very congested.

It seems to be recognised now that whichever scheme is passed the Great Western Railway Company will become the purchaser, as they are anxious to have a thorough connection with Rosslare and the South and West of Ireland, and it naturally follows the Government also will like to see the connection made on account of the naval base which is being established at Berehaven.

The one objection which may be brought against the scheme supported by the Harbour Board is the number of level crossings, as on the main line there are seven, but only two of these come on main thoroughfares, namely, on Albert quay and St. Patrick's quay. As the number of trains running during the daytime will never be great this is not a serious matter, as the trains will not run at a high speed.

The estimated cost of the schemes are:—

The Cork and Waterford Railways, £330,000.

The Cork City Railways and Works, £130,000.

The Cork Link Railways, £150,000.

The estimated cost of the Cork and Waterford Railways is based on last year's Bill; to this must be added the cost of the sidings on the quays. The cost of the Youghal and Cappagh Junction does not come into the comparative costs, as it could be worked into any of the schemes with advantage.

##### Waterworks, etc.

Mr. P. C. Cowan, M.I.C.E., Chief Engineering Inspector to the Local Government Board, held an enquiry at Queenstown in connection with the application of the Queenstown Urban Council for an additional loan of £2,000 for the completion of the waterworks and the renewal of portion of the distribution service pipes in the town.

Twenty-four thousand pounds has already been borrowed in connection with this water supply. Over £800 of the sum applied for is to pay for the Haulbowline extension supply, from which the Council get £377 a year for any amount used up to 200 tons.

The whole scheme has cost a great deal more than was originally intended, owing to several causes. The Council had to take the work out of the contractor's hands and complete it themselves, and had to deal with the increased cost of labour and materials, and also had to take the foundations of the dam considerably deeper than was originally intended.

At the inquiry, the Inspector stated that it was a pity the Council did not see their way to apply for £3,000 instead of £2,000, and that he would not report on the application until he was furnished with a copy of the engineers' report showing the whole scheme for the renewal of the service pipes with a scheduled table.

A Local Government Board enquiry was also held at Tralee in reference to an application of the Urban Council for loans of £4,000 for improvement and extension of gas works, £8,000 for paying off gas debenture shares, and £2,000 for the erection of working class lodging houses, under the Housing of the Working Classes Acts.

During the enquiry the Inspector, Mr. P. C. Cowan, referred to the great waste of public money owing to the manner in which the steam roller was being worked, and also to the manner in which the present roadway was being made in Edward-street. The crown of the road was too high, large and small stones mixed together, and the channels and kerbs were too low, and he considered the manner in which steam rolling was done there was enough to drive steam rollers out of the country. These remarks, coming from one of the pioneers of steam rolling in Ireland and one of the recognised authorities on the subject of roadmaking, should be taken to heart by the public bodies interested in these matters.

## PLUMBING CONTRACTING, WITH SPECIAL REFERENCE TO WATER SUPPLIES FOR COUNTRY HOUSES.\*

By THOMAS BAIRD.

In a former paper I had the pleasure to read to some of your members, I confined my attention to the Plumbing and Drainage of a suburban residence—it embodied a complete specification of the internal plumbing work and drains. I don't remember if I then dealt with the question of iron drains, but I fancy I did not, as our object was a detached residence without drains under the house, and the necessity did not arise. For town houses I think more iron drains should be used. I have met cases where fire-clay or stone-ware pipes were perfectly laid on concrete beds, and jointed with gasket and Portland cement absolutely watertight before and after covering in. In one case, nearly a year after, the drain was still staunch, but the following year's inspection disclosed leakage. On opening up the drain several sockets were found split and joints defective; an iron drain was substituted, which is now some years in use, and still perfectly staunch. In this case it was assumed the cement jointing had expanded, and split the faucets, but whether this would occur after such a lapse of time or not I am not prepared to say. Nor will I say had Medina cement been used the fault would not have occurred. I have not met such a case where Medina was used, but I would not be surprised to hear of it.

### The Value of Iron Drain Pipes.

Apart from the jointing material there are other circumstances which might account for leakage in earthenware pipes, settlement in buildings or ground or forcing a chokeage, for instance. In the latter, if a drain gets choked an injudicious use of a drain plunger will put enormous outward pressure on pipe—sufficient indeed to cause a rupture. Now take Merriem Square, for instance. Quite 90 per cent. of the sanitary appliances are at the rear of houses, and in all cases the drains discharge in front, necessitating an average of about 40 feet of drain under the dwelling. For this length of drain the extra cost of iron over earthenware will only be about forty shillings; but the small extra cost is more than met by the absolute security attained. Indeed in some cases where I was concerned, I fixed iron drains, although earthen were specified. This may sound like philanthropy, but a moment's consideration will show otherwise. A pipe layer will lay such a drain in iron with absolute security and certainty of readiness for architect's inspection in a few hours, once the ground is ready. An earthenware drain will take him best part of a day. Next day, if he knows his business, he has a preliminary test on his own account. If things go well he will have his drain passed the following day. Meantime, shop and supervision costs are going on, and your client is perhaps anxious to get you out of the house, and, on the whole, I think I have demonstrated the absurdity of using earthen or stoneware pipes in such cases. Of course many architects use nothing else, but many others still use earthenware pipes, chiefly, I think, owing to a mistaken idea of cost. The cost I have mentioned is for a straight line of drain, without branches, etc.: an entire system in iron is, of course, much more costly than one of earthenware. In my former paper I dealt fully with modern principles of house drainage—these are too well known nowadays to trouble you with them—but it is well to remember four essentials: staunch drains, free ventilation, rapid discharge, and accessibility. Fifty years since they had no idea of either ventilation or staunch drains but they had ideas of large drains. In fact, even now one is often met with the remark that "it's a fine big drain, etc., etc."

They got rid of the sewage into large built drains, practically elongated cesspits and a paradise for vermin. In the first large drainage job I had charge of the main sewer was about 5 feet by 2, and for the past 15 years a 6-inch pipe is discharging the functions for which this sewer was originally constructed. I do not purpose dealing with sewage disposal for country houses; indeed, even if I considered myself competent the matter is of such a controversial nature that I would not attempt it. I must say, however, that I find many architects either ignorant or unwilling to treat this matter scientifically, and I would strongly urge your

Association to give it special consideration—it is a question on which not one but several papers might be read.

### Copper Pipes.

Copper has, of late years, come into such favour in good work in Dublin that, to my mind, so far as boilers and cylinders are concerned, it is frequently overdone by architects specifying copper for country houses. The popularity of copper in Dublin is the outcome of necessity. Owing to the soft nature of the water and the absence of any protective matter in it, iron cylinders and boilers soon become pitted and leak, hence the use of copper. In country districts where, as in the large majority of cases, the water is hard owing to an excess of lime, a deposit is soon formed on the inner surfaces of vessels used in hot water installations protecting them from corrosion. The difference in the heating abilities of a copper boiler, compared with iron, is too small to notice, if copper possesses any advantages it is more than counter-balanced by the durability of iron, in rough handling and fierce heats. I am not to be taken as advocating the universal use of iron. What I wish to convey is that where hardness in water exists through excess of lime, iron is at least as good as copper for boilers and cylinders, and much cheaper. As to circulating pipes, there is nothing to beat copper for use in Dublin. Lead, if properly fixed, will last many years and give no trouble, but copper, especially for long, vertical stretches, stands variations of temperature much better, and there can be nothing neater than a well handled copper job. The pipes can be fixed without boards and clear of walls and made to look really well; they can be painted to match surroundings or polished at will. As copper pipes in trade usage measure from in to out specifications should state the "bore"—they should also be "solid drawn," namely, without a seam. In the absence of such particulars unscrupulous contractors have a loophole to run in pipes less than bore intended and of inferior seamed quality. I have frequently found persons of opinion that because the water is hard or limey they must use copper. This is a fallacy, as copper will choke under the action of lime quite as readily as iron or lead. I have a small sample here in proof of this. Where lime is in abundance I find it excellent practice to place cylinder as near boiler as possible, both cylinder and boiler being provided with adequate doors for cleaning purposes, the piping between of galvanised iron so arranged that it can easily be detached and opened for periodical scraping and sweeping. By judicious attention almost the whole lime deposit is intercepted before it leaves the cylinder, so that from the cylinder up through the house copper or other material may be used without any special attention, so far as cleaning is concerned. Before leaving this subject, I wish to say a further word about boilers and cylinders.

### Boilers and Cylinders.

Many specifications I have seen merely state "provide a copper boiler or cylinder weighing so many pounds"—no more or less, no mention of thickness or a manhole door. This gives a fine opening to fraud. I have here some samples of what are known as loaded cylinders; the angles formed by junction of side with top and bottom being filled in with lead to give weight. The customer is thus paying anything over about one shilling and fourpence per pound for an article a large percentage of which is made up with metal worth 2d. to 2½d. per lb., and he gets a job that may collapse or burst at any moment. These articles are sold to so-called plumbers at such a low price that I cannot imagine any man with any idea of the market value of copper thinking he is getting wholly copper, and I'm afraid the man fixing such, although sometimes the victim, is often as guilty as the manufacturer. One of these cylinders I took out lately contained 35 lbs. of lead out of 75 lbs., the entire weight. Assuming, therefore, the client paid at the rate of one shilling and sixpence per lb., he was defrauded of something like two pounds ten shillings on this small cylinder, not to mention the risk in using such an article. There are dozens of these things sold in Dublin every month, and it is naturally a ready market, as the absence of deposit from water does not necessitate a manhole for cleaning purposes. I invariably get cylinders with doors, whether specified or not—with a door such fraud would at once be detected, without a door it is almost impossible to detect. In all cases, therefore, an architect's specification should be

\* Paper read before the Architectural Association of Ireland.



full as to thickness of metal, and a manhole door provided. I have a photograph here of another loaded cylinder which collapsed. Of course, almost any cylinder would collapse under certain conditions, but if this one had been of copper throughout, totalling the weight of the fraudulent article, the chances are it might have withstood the external pressure under which it collapsed—in any event it stood a very much better chance of doing so. Of course, you all know the reason a cylinder collapses is by the formation of a vacuum inside—thus leaving an external pressure of some 15 lbs. to the square inch, or on a cylinder of 30 inches diameter a pressure of considerably over half a ton on each inch in length of the outside surface. As to the causes of formation of vacuums there are several: too powerful boiler with inadequate means of escape for steam, the firing of a system from which the cold-feed has been shut off and then suddenly turned on, or the partial stoppage through accident or bad design of the expansion pipe which, through generation of steam, forces the water out of cylinder, leaving only steam; the water then returns cold, and, as in a condenser of a steam engine, instantly condenses the steam and forms a vacuum. In large hotels and institutions boilers for heating and hot water purposes are often duplicated for the purpose of meeting extra demands or as a stand by, so that in event of one boiler going wrong the other may be called on during repairs. To meet this, which is a very desirable object, both flows and returns are joined and stop valves fixed on each near boilers—this is a most dangerous practice. Of course it can be minimised by adopting safety valves and locking the stop valves; but any safety valve may go wrong, and the means of locking or unlocking valves may get into unskilled hands, as has happened more than once in Dublin, with loss of life. When this occurs steam is formed in a vessel from which there is no outlet, resulting in explosion. It is much better to have no valves at all, and although, when something goes wrong, this may cause some inconvenience, it can be reduced to a minimum, and better have a little inconvenience than a constant source of danger. A word about lead for use in connection with domestic water fittings. Specifications often provide for the use of pure Spanish pig lead in the manufacture of sheet lead and pipes. I don't know whether now-a-days, with such artful adulteration in almost all manufactures, it is possible to get the pure article, but if not it is really a blessing in disguise. Pure lead corrodes very easily, and in proof of this I may say that for the manufacture of white lead on the old Dutch or corrosion process the purest lead is invariably used. Almost all the sheet lead used in Dublin is, I believe, made without adulteration, not, perhaps, with any very strict abhorrence of adulteration, but from the fact that enough old or scrap lead is not available, and what there is of this is more valuable for pipe making. The lead piping is almost invariably made from scrap. In this scrap a quantity of solder exists, which, to a large extent, is separated to be again made into solder, but it is impossible to entirely separate it, the result being a pipe, not of pure lead, but for practical purposes quite as good, and as I have said, not so subject to corrosion. The Dublin Corporation have for many years insisted on the use of alloyed pipe where direct connection with the Varrty pressure exists. It is believed that this pipe is free from corrosion and danger of lead poisoning; it is made of lead 97 per cent., with 3 per cent. of tin added. In appearance it does not differ from lead pipe, but if a piece of each were put in position where corrosion would take place it will be found that the piece containing the tin will not corrode nearly as rapidly as the pure lead. This fact has been appreciated for some time by telephone and telegraph companies who put their wires underground. The cables are encased in lead pipe, which are almost invariably adulterated with 3 per cent. of tin. A further proof which, perhaps, some of you have noticed about buildings where a sheet or two of lead had been lying in the rain for a few days resulting in the formation of a white coating (basic carbonate of lead). This coating is not nearly so noticeable on lead piping under similar conditions, it being usually not of such a pure nature as the sheet.

#### Water Supply to Country Houses.

The water supply to country houses is a matter deserving more attention from your profession, inadequate supply for baths, lavatories, and w.c.'s often necessitating the de-

lection of these conveniences so necessary for healthy and comfortable surroundings. The average country house has its well in the stable or kitchen yard, and if free from contamination, although almost invariably hard, is generally wholesome and suitable for drinking and culinary use. The raising of this water for baths, etc., by hand, horse or mechanical means is vexatious and costly. In many cases there are no other sources, but I have known this arrangement in one form or another exist where for an expenditure of from fifty to one hundred and fifty pounds an unlimited and continuous supply was eventually obtained. It is to such cases I wish particularly to direct attention. In the average country gentleman there is, and, indeed, in many architects until late years there was, either a blindness or ignorance of accepting nature's offers. A good spring or the tapping of a stream at an altitude to give a gravitation water supply is overlooked, or, a small stream running below the house is allowed to go waste, sometimes, indeed, in the latter facilities exist for not alone a good water supply but power for lighting, etc. A natural gravitation scheme is undoubtedly the best of any, but the best and cheapest mechanical means of supply is by a hydraulic ram—by the latter, of course, the former can also be attained artificially. The great advantages of a natural gravitation supply are (1) no machinery or power, (2) impounding reserve store of water, (3) pressure for hosing gardens, vehicles, etc., and (4) (provided the altitude is sufficient) means of coping with fire.

#### The Hydraulic Ram.

All these advantages, except the first can, where certain conditions exist, be attained by a hydraulic ram, and the mechanical action is reduced to a minimum. A hydraulic ram is about the simplest and, perhaps, for that reason, the least understood piece of mechanism made. Its possibilities are enormous, and if they were better known and their simplicity recognised many more would be used. All that is required is a stream of water (equivalent to about what will fill a 4-inch pipe) with a few feet of fall, and the means are provided for sending a good supply to an altitude of hundreds of feet. Many people are under the impression a ram will not force water beyond certain limits comparable with the fall available. There may be a limit, but I have yet to find it—in any case the limit (if any) is so great that for ordinary practice we may discard it, and I hope to prove this. Some years ago I submitted a proposal to a nobleman for a hydraulic ram to supply his mansion, farmyard, etc. The available fall was 5 feet, and I proposed to send the water to an altitude of 95 feet. The nobleman was not poor, but being a keen business man he applied to the Board of Works for a loan to do the job. The official who had to deal with the matter reported adversely, and stated as his reason "that it was well known a ram required one foot of fall for every 10 feet the water had to be raised." This report was sent on to me, and I contradicted it and referred to numerous places where rams were doing more than intended with the one under reference. Possibly my client brought influence to bear, but in any case the job was done and turned out very satisfactory. This is only one instance showing how little these machines are understood. I have here some records of actual tests I conducted personally to ascertain what could be done on low loads—by this I mean 4 feet and under. I shall be happy to supply this record to any who care to have it. I find that with 4 feet head I delivered water at an altitude of 150 feet, and with a 6 feet head I delivered water through  $5\frac{1}{2}$  miles of piping against 200 feet altitude. I have prepared a rough sketch, and if you will follow me in a description it explains simply the working. A hydraulic ram is a machine which utilises the momentum of a stream of water falling a height to elevate a portion of that water to a greater height.

A is a ram consisting of a body X supplied with water through a drive pipe B fed from a tank D. On the body X, there is a waste outlet valve G, which, for the purpose of understanding the principal, you may imagine is a "door" opening inwards and which drops by its own weight. F is an air chamber connected to the body X by a passage Y with a delivery valve R, or say a door opening outwards into air chamber. The only outlet from air chamber is the delivery pipe K carried to where water is wanted. Assume the water level in tank D is anything from 2 feet up over level of G, and that upper end of pipe K is many feet

higher, the action is as follows: Open valve C on end of pipe B and water immediately begins to escape at valve G, but as the velocity of water passing through valve increases the impact of water on under side closes it suddenly and blocking the exit of water. Then the momentum of the water in pipe B thus suddenly checked raises pressure in body X and passage Y pushes open valve R, by which operation it is expended, but not before some water is forced into chamber F, which is retained there by valve R. Immediately this happens, the momentum being expended, valve G again drops open. Then the water flows out by valve G again, and the whole cycle of operation is repeated so long as water level in drive tank D is maintained—each operation, repeated from about 40 to 200 times per minute, drives a little more water into chamber F, compressing the air in it, and as there is only one outlet pipe K the water gradually rises in this till it emerges where required. Rams never require oiling or packing, and there is no cost whatever for motive power, as that is obtained from water passing through ram. They require little attention. A casual inspection by an ordinary handy man a few times a year to see that no bolts get loose, or dirt accumulates, is generally all that is required. I have, in fact, known some rams allowed to work for months on a stretch without once been looked at. Of course, this is not right, as the supply in such cases is many times the demand, the water being allowed to run waste and causing unnecessary wear on valves, but I mention the fact as an illustration of the abilities of this little machine. I cannot deal here with the many other means of supply, such as turbines, gas or oil engines, and windmills; but in reference to the latter, of course, you want wind to work them. Wind is very cheap, but it is not always available, and as illustrating this, and a further proof how little rams are understood, I will give you an instance. Some years ago tenders were invited by a public body for a supply of water to a village in Co. Wicklow. It was proposed to take the water from a small stream about a quarter mile outside the village and 100 feet under the level of storage tank, and pump it with a windmill. I visited the place and discovered the stream to be an ideal site for a ram. I saw the engineer and explained this. I tendered as per specification, with an amended and cheaper estimate for a ram, and got the job and did it with a ram. As it turned out, the day we arranged for the ceremony of turning in the water there was not enough wind to ruffle a feather; but we set our ram working and had water distributed to the street fountains shortly after, and it is still working away.

#### Piping for Underground Use.

I wish now to deal at some length with the piping for underground use for water supplies. The size of piping is of first importance, and should have more attention from engineers. With a given head and other conditions it is easy to arrive at a size theoretically correct to give a certain supply. But the nature of the water and other circumstances should be taken into account. On the score of cheapness, or first cost, many engineers specify pipes theoretically correct, but not right in practice. I have known cases where they were not even right theoretically—they almost invariably err on the small size. I had a job some years ago to pump water some six miles. The pipe specified was 4-inch bore, and the difference in level between the pump and point of exit was about 70 feet. There was an oil engine of a certain power specified to send a given quantity of water, and luckily for us we went into the matter before it was too late. We found that to send the quantity of water through the six miles of 4-inch pipe would, owing to friction, increase the head we were to pump to from 70 to 230 feet, and that the engine specified would not, under any conditions, do the work. The result was the pipe was increased to 5-inch and the engine power by 50 per cent. Even under these conditions the working head was about 150 feet. A case of this kind would rarely, if ever, occur in a country house supply, but as some of you may perhaps later on be designing larger schemes, I think you would do well to remember it is a good fault to have a large enough pipe. The class of pipe to use for

small supplies is a matter about which there is also many errors. For a ram, pump, and even gravitation schemes, some engineers are very fond of using gunbarrel—sometimes it is plain and unprotected, but mostly galvanised. For lengths of 200 or 300 feet it is often fixed 1-inch bore, and this if plain soon gets fired up inside and chokes; with galvanised pipe this does not occur so soon, but eventually does where the joints occur. These joints are made with screwed sockets—the screwing, of course, abolishing the galvanising, leaving an unprotected portion more or less exposed to action of water where a blob of rust sooner or later forms with the inevitable result. Gunbarrel is used often under a mistaken idea that it is cheaper than cast iron—it is only cheaper, and then not much, where sizes of about an inch bore is only necessary, and for the reason that cast iron pipes are not commercially possible under 1½-inch bore. For sizes of 1½ inches and upwards cast-iron is cheaper, the more so the greater the bore. From what I have said, therefore, you will see that under any circumstances it is not alone no saving but a mistake to use gunbarrel for underground water pipes. The right pipe is cast-iron properly coated with Dr. Angus Smith's solution—they are made from 1½-inch bore by 6 feet long up to 48-inch bore by 12 feet long. Lately steel pipes are being used, but I need only mention this as, if ever, it will be years before they supersede cast iron in general practice. There are two usual means of joining cast-iron pipes. What are known in the trade as spigot and faucet pipes are joined

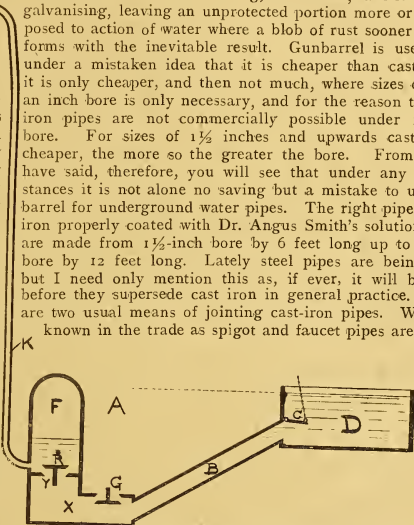


Diagram showing Working of the Hydraulic Ram.

with gasket and molten lead staved staunch; turned and bored pipes are simply driven one into the other. I have samples here of both sorts for your inspection. All sizes are made spigot and faucet, but the turned and bored are not recommended under 2½-inch bore. The proper coating of these pipes is calculated to resist the action of the water for many years, and I have seen some lifted after 20 years' use very little the worse. Of course some water will have more effect than others. For good work and high pressures it is important to have good pipes; they are made in two qualities—horizontally and vertically cast. Horizontal are cheapest, and for ordinary and regular pressures are, provided they have been properly tested and coated, good enough for the average country house supply; but there is a vast difference in the quality and, consequently, the cost. I have here cut samples of horizontal and vertical cast pipes, and the difference is at once apparent. The sample of horizontal is a very bad specimen; few are so bad, but it proves what may be expected and what would be hardly possible if vertically cast. In the trade, vertically cast pipes are for shortness styled drysand, and horizontal cast greensand. I will use these terms in giving my views as to the relative merits of each and describing mode of manufacture. Greensand pipes are cast on a bank sloped at an angle of about 30 degrees; the term green is not on account of the colour, but to the raw or undried condition of the sand cores. When the metal is poured in of course it fills the lower side of the mould first, and in doing so it often lifts the core out of its true position in the centre of the mould, which almost invariably leads to the pipes turning out of unequal thickness on opposite sides; further, the core being damp is liable to produce air bubbles and hollow portions in the metal. To minimise to an extent the lifting of core and, indeed, to support it, what are known as core nails or chaplets are used in greensand pipes. These consist of short pieces of round iron placed across the mould which, to some extent, become amalgamated with the melted metal. After removal these nails are cut off and hammered up, but in a large percentage of cases they depend on the coated to staunch them. As the metal is



poured in the better and heavier metal gets to the bottom of the casting, forcing the poorer metal to the top or other side. This, again, is a source of weakness.

This was the early method of making pipes; thousands of tons are yet made in this way up to 12-inch bore, but very few are now made over 6-inch bore. This method has been superseded for first class work by drysand pipes. Under this method the cores are dried in a stove and held in a vertical position in properly prepared boxes with the sockets of the pipes down. There is then no tendency to produce unequal thickness. The socket which is the tenderest part of the pipe, in that it is subjected to heavy strain when jointing, is produced in a manner best adapted to give it solidity, being formed under the pressure of the whole fluid metal in the rest of the pipe, which stands above it to a height of 9 or 12 feet, according to bore. Further, in this operation there is a lump of metal formed by the filling of aperture through which metal is poured, attached to end of each pipe when removed from mould; in this all the lighter or poor metal gathers and is cut off in a lathe. In all drysand pipes, therefore, there is evidence of this cutting at the spigot end, but this is no proof they are drysand pipes. I have seen greensand pipes with this machine mark on them, but they were frauds. As the difference in price is about £1 per ton you can easily understand that it would pay an unscrupulous maker to set his pipes in a lathe and give them a scrape with a cutter. Many engineers are taken in in this way; indeed some pipes are so well faked as to be very difficult to determine which is which. When I tell you that I have seen our present Borough Surveyor on his knees examining a 6-inch pipe you will easily understand the difficulty. The absence of chaplets or core nails and the inequality or absence of a seam are proofs, but there are various ways of faking these and the best way is to buy only from drysand makers, and as these are all firms of eminence their guarantees may be taken. I would like to go even fuller into this question, but I fear I have already tried the patience of the younger members.

#### RHYMING SPECIFICATIONS.

The following amusing rhyming "skit" upon the general conditions of a specification appears in the current issue of the Architectural Association Journal. The gifted poet does not disclose his identity:—

	A Specification of Works To be done for Sir Anthony Shirks, Knight, G.C.M.G., At Ye Olde Hollie Tree, Near Slough, in the County of Berks.
CONTRACTOR.	Hereby I name you the Contractor, It's a job you'll be sorry you're let in for, As you will agree when you come to know me, For I am John Jones, of Mosteley-at-Sea. Yet I am the man whom you must respect, For I am his honour, the Architect.
ARCHITECT.	His honour, the Architect!
DRAWINGS.	The Drawings, as you may possibly see, Are numbered from one to twenty-three; And whether they're right, or whether they're not,
DIMENSIONS.	Dimensions must always be checked on the spot.
COPIES OF DRAWINGS.	A copy of any or all you select Will be sent by his honour, the Architect. His honour, the Architect!
INSURANCE.	The Contractor the works shall safely insure In an office that's certified healthy and pure.
FOREMAN.	A competent foreman he also must keep Day and night on the ground, and he never must sleep.
RELICS. OWNERSHIP OF.	The Client will have the ownership Of coins or relics that anyone finds. The materials and all the workmanship
MATERIALS.	Must be of the best of their different kinds. For I shall not pass a single defect, As I am his honour, the Architect! His honour, the Architect!
DISPUTE.	If any dispute on the works should arise Between you or the client or even your wives, And they, or yourselves, come to blows or black eyes Why you've always an abiter honest and wise. My decision is binding, and quite correct, For I am his honour, the Architect. His honour, the Architect!



#### ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

##### The Rising Flood.

For a long time, in Dublin, the tide has been dead out as regards architectural education. About three years ago, however, it began to turn, and we can now see the breakers and realise that the flood is not far off.

The committee appointed to control the movements of the "Educatic" ocean have presented a carefully prepared report to the powers that be, and we understand that the matter is being seriously considered.

We recommend all students, would-be students, or should-be students, to prepare their bathing costumes and determine that when the time comes they will not stand shivering on the brink but will plunge boldly into the invigorating and sustaining flood.

##### The Dinner Bell.

Even talking of seaside exercises is enough to give one an appetite, and we very naturally turn to the question of dinner. The official dinner of the Association has not been held for the last two years, but is now to be resuscitated. It appears to be almost a law of Nature that if you want to know your neighbour properly you must eat with him, and, certainly, mutual acquaintance and appreciation is one of the first necessities to a strong corporate existence.

##### The Museum.

The shelving for the museum has commenced, and is being carried on slowly but surely. It is to be hoped that the people in Kildare-street will not be jealous at the opening of an opposition establishment in the neighbourhood; but after all, they have only themselves to blame, for if they had awakened to a sense of their duties in this matter and established a collection of raw and manufactured materials in current use, doubtless this would have supplied the long-felt want and rendered the action of the Association unnecessary.

Is it true, with exhibits, as with families, that it is only the quality of "age" which confers that aristocracy which may be fitly housed within cut stone walls and approached between classic columns?

##### Obituary.

We regret to hear of the death of one of our members, Mr. J. W. Graham. The matter was not notified to the committee, who were only made aware of it by the returning of a letter marked "deceased." This accounts for the death not having been referred to at one of the general meetings. We tender our sympathy to the relatives of Mr. Graham, and trust that this explanation will show that this matter has not been intentionally overlooked by the committee.

Messrs. George Rome and Co., Plastering Contractors, have removed to 5 Clanwilliam Place, Dublin.

In reference to the latest volume of "The Architects' Law Reports," which we review in our present issue, we have received the following communication from the Editor, Arthur Crow, F.R.I.B.A., in reference to our notice of the previous volume:—"Referring to your review of Vol. I, I may mention that the 'Law Times Reports' are accepted by the English Courts without question. The Lord Chief Justice on one occasion commented on their general accuracy, and accepted the report of what he had said as correct."



## REVIEWS.

**Gothic Architecture in England.**

By FRANCIS BOND,

M.A., Lincoln College, Oxford; Fellow of the Geological Society, London; Honorary Associate of the Royal Institute of British Architects. An Analysis of the Origin and Development of English Church Architecture from the Norman Conquest to the Dissolution of the Monasteries. With 1,254 illustrations, comprising 785 photographs, sketches, and measured drawings, and 469 plans, sections, diagrams and moldings. Imperial octavo. 800 pp. Strongly bound in art canvas, gilt. Price 31s. 6d. nett. London: B. T. Batsford, 94 High Holborn. 1905.

Of all the works of architectural interest that Mr. Batsford has put before the public during a long series of years, many being of classical excellence, he has published no better book on the subject than Mr. Bond's "Gothic Architecture in England." Needless to say, the subject is one that has often before been dealt with, from the time of Rickman, Paley, Pugin, Edmund Sharp, and many another; but for some years past the time has seemed ripe for the production of a work of standard character on Gothic Architecture in England; one that would bring under contribution the wonderfully improved facilities that nowadays exist for photographic reproduction, and would, generally speaking, be worthy of the subject and of the possibilities of the modern printer's and photographer's art. Many have essayed the task, few with any conspicuous success; true, we have had works on special aspects of that great subject, "Gothic Architecture," which those two simple words so inadequately convey the artistic importance of to the lay mind. One or two authors have during recent years made a reputable and scholarly effort, but none that we know of on quite so adequate a scale as Mr. Bond. Mr. Bond is very well known as an authority upon the subject on which he writes, and has in his present endeavour produced a history that, we believe, is sure to be regarded as a standard text. Mr. Bond is not an architect, we understand, but he is an Honorary Associate of the Royal Institute of British Architects, a distinction conferred upon him in recognition of his labours.

The present work stands out from amongst others in regard, not alone to the lucid writing of the author, but also for the intelligent and discriminating use that has been made of photographs, all of which have been reproduced in the most artistic fashion, with due regard to the picturesque as well as the practical element; in fact, it is impossible to speak too highly of the fashion in which the task set himself by the author has been discharged, or the ample manner in which he has been seconded by his publishers and printers. The fullest use has also been made of the plans, details, and measured drawings of contemporary students' work, and it is not too much to say that the work bears every indication of having been produced regardless of cost—hackneyed as that term may appear.

The study of Gothic architecture, as set forth by Mr. Bond, has been undertaken in no amateurish or *dilettanti* fashion, but has been viewed from a practically scientific, as well as artistic, standpoint, for it is evident the author is an enthusiastic student, and one who possesses in a remarkable degree the faculty of logical arrangement. He has, in the greater part, abandoned the conventional treatment by division into arbitrary periods. Useful as that method may be for purposes of purely elementary study, it causes the more advanced student trouble and doubt, by hindering him from following the particular features through the sequence of development. That the work is produced on lines conducive to pleasant and profitable study, is evidenced by the fact that the illustrations number no less than 1,254, some of the whole page collotypes being really beautiful pictures. The author has visited, he tells us, nearly every important church in England. Many of the photographs were taken by himself; most of these photographs by himself and others have never before been published. That the work is also a thoroughly practical text is proved by the inclusion of no less than twenty-eight sheets of moldings, all being drawn boldly and clearly to scale, while all the illustrations other than photographs are reproductions from the work of modern draftsmen of skill.

Chronological lists are given of the chief examples of Norman and Gothic architecture, and much time and labour have evidently been expended in making these very complete, while last, but not least the whole is admirably arranged and easy of reference. We should have very much liked to reproduce a specimen illustration, but that we feared that one single illustration would most inadequately convey to our readers the richness of this splendid work, than which we can imagine no more delightful and acceptable gift to an architect.

Mr. Bond has, in addition to his more personal efforts, laid out his contributions the chief standard works that have preceded his own, notably that grand work, "Sharp's Parallels," and Messrs. Johnson and Kenney's "Churches of the Nine Valleys."

In a notice such as this it is obviously impossible to follow Mr. Bond through his masterly analysis of the progress and

development of pointed architecture. Still less it is practicable to explain the lucid fashion in which he expounds the evolution of particular details. Suffice it to say that he takes in order or turn the several more important features of a Gothic church, and deals with each in turn. The amount of study disclosed by this minute examination of particular features is very great, and almost every point explained or specially referred to is well illustrated. To instance one particular: "vaulting," having dealt with the functions of flying buttresses, and the opposition of thrusts, the author gives several splendid chapters entitled "groined vaults," "the construction of ribbed vaults," "vaults with diagonal ribs," and "Gothic vaults," in the first of which he traces the development of groined vaults, indicating the object of vaulting, the peculiarities of Roman groined vaulting, Romanesque groined vaulting, vaults in crypts and so on.

We have before mentioned that Mr. Bond is not an architect, but a perusal of these two chapters will show the professional reader that he is no ordinary amateur; both from the historical and constructional standpoint, the perception and analysis of material and form is admirable. In the chapter on groined vaults, he tells us that "the builders became exceedingly expert; they succeeded in vaulting, not merely squares, or oblongs as at S. Nicholas, Caen, but trapeziums and triangles, as at Winchester Crypt (1080), and in Gloucester Ambulatory; or, sometimes, as at Winchester, they covered the apse not with a semi-dome, but with a series of triangular-groined vaults. In the ambulatories, they banished the trapezium by vaulting the bays alternately in squares and triangles." Mr. Bond, in the chapter on "the construction of ribbed vaults," traces the development of the rib, showing how useful and clever, though heavy, the earlier groined vaults were. The ribbed vault, he says, was an improvement which superseded the groined vault after a life of twelve centuries, and completely revolutionised the history of mediæval architecture. It substituted the rib for the sharp edges of the groins, and got rid of the especial weakness of the plain groin in the weakness of the diagonal groins, and it enabled the builders to construct the work with greatly less centering. Mr. Bond goes so far as to say that the mediæval builder, instead of having to prepare the centering for all four cells at once, could employ it for a single cell, take it down, reuse it for another cell, and so on, a somewhat doubtful piece of economy, we think. The centering for vaulting each cell, too, was of the simplest character, merely a set of planks of the required short lengths. With these he bridged the space from one diagonal rib to one of the four outer arches, and that even then a further improvement was made. It was that two planks were so fastened together that one would slide on the other, forming an extensible plank or template ("cerce"). Thus the *cerce*, drawn out to any length required, might supersede planking altogether. Centering would thus only be required for the construction of the arches, diagonals, transverse arch, and pier arch.

In short, the series of chapters on vaulting constitute together one of the best treatises of explanation of this subject we have ever seen. The plans and sections of striking out are admirably clear, the diagrams showing the principle so plainly that a careful study of this section of the work should give an excellent insight into methods upon which they are struck, and rob this often misunderstood work of much of its mystery that so appals beginners. Many works on Gothic Architecture deal quite exhaustively with vaulting, but fail to expound with sufficient accuracy and simplicity the principle upon which it is worked. Mr. Bond gives no form of construction without a rational explanation.

**Academy Architecture and Architectural Review, 1905.\***

Edited by ALEXANDER KOCH, Architect.

This popular annual which now reaches its twenty-seventh volume is this year better than ever. It comprises a selection of the principal drawings hung at the exhibitions of the Royal Academy, the Royal Scottish Academy, Edinburgh, and the Royal Glasgow Institute of Fine Arts, a selection of Sculptures and a review of certain architectural projects in England and abroad; a combination which makes it a very interesting volume.

The Royal Hibernian Academy is entirely unrepresented. The section devoted to drawings of churches becomes year by year smaller, and it cannot be said that the reduction in quantity is compensated for by improvement in quality. Most of the designs display a striving after originality that is far from pleasing, and none of them are of transcendent merit. One of the best works illustrated is Mr. J. Harold Gibbons' "Sketch design for a painted Rood Screen." A good "working" church and rectory is Mr. G. H. Fellowes-Pryne's "St. Martin's, Worcester." Mr. W. D. Caroe's Church of SS. Andrew and Patrick, Elvedon, for Lord Iveagh, is badly proportioned in its depressing and overloaded interior, particularly in regard to the roof. An otherwise simple and inoffensive little church, St. Chad's, Longdon, by Mr. Gerald C. Horsley, is spoilt by a tower and spire that can only be described as pain-

\*"Academy Architecture." London: 38 Theobald-road, W.C. Price 4s. net.

fully ugly. There are no other designs worth noting. The work of Scott, Street, Burges, and of the school who followed them, may certainly have been stamped with the mark of sameness. But they were, at all events, superior to the depressing efforts of many more up-to-date designers of ecclesiastical buildings.

In the secular section, the important public buildings are not numerous. Sir William Emerson's Calcutta and Victoria Memorial is an imposing structure, that groups well under the central dome. Some interior views of Messrs. Lanchester and Rickards' Cardiff Town Hall are amongst the best things in the volume, and show that real thoughtful work is being done in our great municipal edifices. A couple of good schools on the larger scale, by Messrs. Arnold Mitchell, and Leonard Stokes, are illustrated, and are excellent types of their class. Two or three street fronts to private houses in London are interesting. The few business premises are not notably good. There is an interesting and suggestive project for a covered bridge by Mr. Robert Atkinson. Mr. Ernest George shows some fine scholarly additions to Welbeck, for the Duke of Portland. Taken as a single example, by far the most interesting work illustrated in the whole volume is the "Midlothian County Buildings," Edinburgh, by Mr. James MacIntyre Henry. Few municipalities or local authorities have secured finer or more scholarly designs than this Edinburgh example, which is worthy of all study, fit to take its place amidst the finest of the eighteenth century work in Edinburgh; and Mr. Koch's volume is worth buying for the illustrations of this work alone, for we do not remember to have seen it illustrated in any of our contemporaries. It has a dignity, repose, and scholarly feeling that is not common, but that is not so remarkable, seeing the high standing of the Scottish school. Several others of the Scottish designs rank high in the collection. In the domain of the country house, the English school of architecture is, of course, easily first in Europe, though we remember to have seen a better display in the pages of "Academy Architecture" in other years, but then times have been especially dull of late and work scarce. One of the best domestic designs is a manor house of Mr. Arnold Mitchell's, with an untranscribable Welsh name, designed for Carmarthenshire, in the traditional style of the English manor house.

Only two Irish works, and both by English architects, are illustrated. One—Sir Horace Plunkett's new residence at Foxrock, by Mr. W. D. Caröe—has a curious V-shaped plan, doubtless dictated by some sufficient considerations of aspect, but not pleasing at first sight. The other—a big house at Tullylagan, Co. Tyrone, by Messrs. Alfred H. Hart and P. L. Waterhouse, (for whom is not mentioned)—is a pleasing design. Messrs. Guy Dawber, Arthur Keene, and Andrew V. Prentice each show some very nice work.

The foreign section is more interesting than appealing. Every architect should order a copy of "Academy Architecture" to keep in touch with what is being done.

### "British Competitions."

Together with "Academy Architecture" we have received for review the first four numbers of "British Competitions," a new publication issued in parts by the same publishers, each part devoted to a particular architectural competition, the four parts in question being devoted to "Lambeth Municipal Buildings," "Wesleyan Methodist Hall, Westminster," "Islington Central Library," and "Epsom Parish Church," respectively.

The Lambeth competition produced a very fine series of designs. Many of them show great ingenuity in planning, one or two being of very superior artistic excellence, though none seem to have fully risen to the occasion in the treatment of this fine angular site.

The competition for the Westminster Methodist Hall seemed to have rendered architecture a national service in bringing back, or at all events tending to bring back, the taste of architects to a more dignified and imposing style of treatment. Seldom in recent years have so many fine designs been brought together in a single competition, and, happy to relate, the accepted design seems to be the best. Messrs. Lanchester and Rickards have a really fine building, fit for the most prominent situation in any metropolis. They are to be congratulated upon their deserved success.

Islington Library competition was a more modest affair altogether, and attracted a much lesser array of merit, the accepted design, by Mr. Henry T. Hare, towering far above that of the other competitors from an artistic standpoint. It is a really fine design, in the best manner of the English renaissance. These three competitions mark very distinctly the return of English architects to more solid forms of design, and a revolt against the eccentricities and "prettiness" of the preceding decade.

The competition for Epsom Parish Church is, on the other hand, disappointing in the extreme. It was a competition that one would have imagined would have drawn forth really fine work, for it is seldom in England nowadays that there is a competition for a big church. The result in the present case cannot be regarded as a really worthy response. Gothic in some shape or form seems still to hold the field in favour.

The accepted design, by Messrs. Nicholson and Corlette, however, has many points of merit. The plan is dignified and good, and gives a fine interior. Unquestionably, the assessor, Mr. Fellowes-Prynn, hit upon the best design. The side view, in particular, presents an appearance of great attractiveness, some originality, yet, withal, a regard for conventional tradition. The general handling of the masses is remarkably good; the chief weak point, it seems to us, is the consideration how it is all to be done for £14,000 or £15,000.

In all the Gothic designs the interiors are the best features. The successful competitors presented an alternative design in a Byzantine or Romanesque spirit, that has much to commend it, but in this case the interior is the weak point, looking somewhat squat and depressed.

This series, illustrating the principal designs submitted in important competitions, should be most valuable to architects, as showing the work of some of the best designers.

### Hazell's Annual.

We have been favoured with a copy of "Hazell's Annual" for 1906, and find it is quite up-to-date. The current edition contains more new matter than any previous issue. It is a very useful volume, and should be on the desk of every business man. There are many pages devoted to Ireland and its government, including chapters on Area, Population, County Councils, Local Government Administration, Racing Statistics, etc., etc. This is the twenty-first year of publication, and the price is 3s. 6d. net. London: Hazell, Watson and Viney, Ltd., 52 Long Acre, W.C.

### Builders' Work in its Legal Aspect.

This, which is one of the series of Mechanics' Manuals issued by Messrs. Cassell and Co., Ltd., and edited by Mr. Paul L. Hasluck, contains in a form convenient for everyday use a number of articles, most of which were contributed by Mr. A. C. Passmore to the *Building World*. An acquaintance with legal forms and with legal decisions having reference to building contracts and the liabilities of contractors is of great importance to the building trade. This manual, therefore, contains information which will be found useful in affording particulars as to the legal positions of the building owner, architect, quantity surveyor, and, especially, the builder. The subject in all its bearings is fully and lucidly dealt with, and the manual is certainly wonderful value for 6d.

### Haworth's Practical Timber Measure and Timber Buyers' Tables.

This manual, which is published at 1s. by Messrs. A. Haworth and Co., Ltd., 84 Leadenhall-street, London, E.C., contains a great variety of information of the highest value to timber merchants, builders, and all whose business brings them into touch with the timber trade. Some of the tables being based on the St. Petersburg standard will not apply directly to the Irish trade, but they can be made to do so by bearing in mind that the ratio of the Irish to the St. Petersburg standard is as 18 to 11. Apart from this, the book contains a great many tables and information which are not readily obtainable elsewhere. Timber merchants, especially, will find it most useful.

### LAW.

#### Workmen's Compensation Act—Important Case

In the City of London Court on December 8, his Honor Judge Rentoul, K.C., gave his decision in a claim made under the Workmen's Compensation Act by William, Maud, and Alice Hatfull, of Leyton (aged 25, 26, and 28 years respectively), the children of Alfred Hatfull, a stonemason, who was killed while working for the defendants, John Greenwood, Ltd., builders, Arthur-street West, London Bridge.

One of the daughters was housekeeper to her father, and the other a dressmaker.

The defendants contended that it was an unprecedented point to raise that an adult could recover under such circumstances. The Act never intended such a thing.

Judge Rentoul said he had grave doubts as to whether the Legislature ever intended that adults should so benefit. He, however, under all the circumstances, and after consideration, had decided to award £100 to each of the daughters, but nothing to the son. The son was engaged in work independent of his father, but declared that for the past 18 months he had earned nothing, although previously he had made 25s. a week.



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## REVIEWS OF CATALOGUES.

**Messrs Kirchner's Catalogue of Machines for Carriage Builders, Contractors, etc.**

This, which is a bulky and splendidly illustrated catalogue, contains descriptions of practically every type of wood-working machine. Messrs. Kirchner's manufactures are well-known as being thoroughly up-to-date and as representing the highest development of machinery for the sawing and dressing of wood. As a mere book of reference this catalogue will be found most interesting, and we would strongly recommend those of our readers who contemplate the installation on either a small or large scale of wood-working plant to possess themselves of a copy, and to acquaint Messrs. Kirchner of their requirements before placing their orders. The address of the firm is 21 to 25 Tabernacle-street, London, E.C. We may mention that Messrs. Kirchner and Co.'s works are the largest of their kind in the world, employing upwards of 1,000 men on woodworking machinery alone.

**Messrs. Gibbons Brothers, Ltd.,** Dibleade Works, Dudley, England, send us their latest catalogue of Band Conveyors and accessories. This list, which is well illustrated, contains photographs showing the most up-to-date improvements in the manufacture and design of Band Conveyors. Messrs. Gibbons' system of transport is applicable to almost every industry, and has come largely into use owing to the following advantages:—(1) Reduced capital outlay; (2) lessened upkeep; (3) small amount of driving power required; (4) total absence of noise in running. Amongst the materials suitable for transportation by these conveyors are all kinds of grain, coal, coke, ore, cement, phosphates, broken stone, concrete, sugar, saw-dust, etc. Messrs. Gibbons will be pleased to receive and carefully consider all enquiries addressed to them, and to furnish designs, specifications, and estimates free of cost. They guarantee perfect working of every installation.

**Messrs. R. J. Nicholson & Co.,** 26 Cannon street, Manchester, send us particulars of their "Ideal" Petrol Engine, which has been specially designed for use with petrol as a fuel. The engine is of the two-cycle type, giving an impulse every revolution. Owing to the simplicity of its construction, it dispenses with all skilled attendance, and may be safely run without close supervision. Like all petrol engines of moderate power, it is very easy to start—a great recommendation where the work is intermittent. The space occupied is exceedingly small, the running steady and reliable, and the consumption of petrol low. The "Ideal" engine is made in two styles, one suitable for electric lighting, and the other for general power purposes, such as driving small machinery and farm work. For the latter purpose it has many outstanding features, amongst which are its extreme simplicity, light weight, and portability. The engine is made in four standard sizes—2, 4, 7½, and 10 B. H. P. respectively. For electric lighting Messrs. Nicholson supply, along with the engine, a dynamo of the protected type, in the smaller sizes two pole, and in the larger sizes four-pole. It is specially designed to secure the utmost regularity of voltage under varying loads. In placing this combination on the market, Messrs. Nicholson have made an exhaustive study of the special conditions attaching to the lighting of country houses, with the result that they have made it possible to secure a thoroughly reliable, and at the same time reasonably-priced, electric light equipment. This should get over a difficulty that has hitherto presented itself to country house proprietors, who, while regarding electric light as a convenience much to be desired, have been deterred by the prohibitive cost of installation. Messrs. Nicholson invite correspondence on the subject, and those of our readers who have been considering the matter, or who require a small power plant for general purposes, would be well advised to put themselves in communication with the firm.

## OUR ILLUSTRATIONS.

**Architectural Association of Ireland Annual Excursion.**

As a Supplement to this issue, we are enabled to reproduce a few of the photographs taken at the A.A.I. excursion, held in August last year in the quaint and charming town of Shrewsbury. It will be remembered that a full description of the town was printed in our issue of August 26th last, and to this we would refer our readers, the photographs being selected with a view to illustrate that article. We are indebted to the president, Mr. H. Allberry; Mr. H. G. Leask, hon. sec.; and Mr. Harrison, who kindly supplied us with the view for reproduction.

Scotland holds the record for the largest technical college, On December 21st, Captain Sinclair, Secretary for Scotland, opened the West of Scotland Technical College, which is the largest building of its kind in the world.

## ANSWERS TO CORRESPONDENTS.

**Flat Roofs.**

A Southern correspondent, C., writes:—"I am building an addition (30 feet by 20 feet) to my house, and think of putting a flat roof on same. Would you please give me your advice as to so doing, naming all the disadvantages of flat roofs in general."

[Flat roofs have of late years greatly enhanced their popularity. Setting aside considerations of appearance, flat roofs have several advantages: they enable a structure to be completed of a given size with the smallest possible cubic contents. They enable the surface of the roof to be utilised practically as a garden or yard. They are cheap and fairly lasting. Per contra: unless executed in the right way they leak, and in process of time fail much sooner than a slated or tiled roof. As to the varieties of flat roof, lead comes first, but it is expensive; next comes concrete covered with asphalt, but it also is open to the same objection; last come patent bituminous composition roofs, the patent "Vulcanite" being one of the best of these. It is cheap, durable, and efficient, and has a life of from 15 to 35 years, according to the quality and make of roof used. For such an addition as you speak of, "Vulcanite" roofing seems peculiarly well adapted. The address of the Company is Laganvale Works, Belfast. Unless aesthetic considerations interfere, we should have no hesitation in recommending you to consider "Vulcanite" patent roofing.]

**Breeze Concrete in Floors—Amount of Breeze per yard.**

"M.D." Dunmore, asks how much breeze will he need to lay a solid wood floor in his house.

[One load of breeze will suffice for about eight yards super of breeze flooring five inches thick, and there are about five to seven loads in a railway waggon. Side boards should be put to the carts or the carters will make a big job of it and make ten journeys for one waggon load. Probably two to three waggons full will suffice for the purpose.]

**Engineering Information.**

Mr. Acheson H. Thompson, Belfast, writes:—"I shall be glad, and much obliged, if you will kindly inform me what papers I should get in order to get particulars of engineering, etc., requirements to be tendered for throughout Ireland from time to time."

[The Building and Engineering News columns of the IRISH BUILDER afford information as to works in progress or contemplation. If this is not sufficiently exhaustive, the only plan for you would be to subscribe to a news cutting agency, such as Mr. O'Keefe, Advertising Agent, D'Olier-street, Dublin. If you write to him, describing the exact class of information you require, he will quote your terms.]

## IMPORTS.

## PORT OF DUBLIN.

December 24th, per Velinholi, from Port Dinornie, 100 tons slates, T. and C. Martin, Ltd.

December 28th, per City of Dresden, from Rotterdam, 21 cases glass, to order; per City of Berlin, from Ghent, 2,697 bags cement, 4 cases limestone, to order; per Lady Wolseley, from London, 20 kegs lead, Brooks, Thomas and Co., Ltd.; 26 packages lead, S. Boyd; a quantity timber, a quantity asphalt, to order.

December 30th, per Corniston, from Duddon, 100 tons timber, H. Morgan; per Pandora, from Bangor, 190 tons slates, N. Maughon.

January 1st, 1906, per Minerva, from London, 120 slate slabs, to order; per Lady Roberts, from London, 950 sacks cement, T. Dockrell, Son and Co., Ltd.; 600 do., do., Wallace Brothers, Ltd.; a quantity timber, to order.

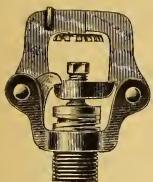
January 2nd, per Lady Martin, from London, 600 sacks cement, Locke and Co.

January 4th, per City of Brussels, from Antwerp, 64 cases window glass, Leporsonne and Co.; 5 do., do., A. Bassi; 286 do., do., T. Dockrell, Sons and Co., Ltd.; 175 do., do., Brooks, Thomas and Co., Ltd.; 10 do., do., McCulloch and Nairn; 54 do., do., J. Arigo and Sons; 6 do., do., Delpelee, Houdre and Co.; 80 do., do., T. and C. Martin, Ltd.; 45 do., do., Hoyte and Son; 30 do., do., Plate Glass and Sil. Mfg. Co.; 35 do., do., H. Sibthorpe and Son; 5 do., do., Price Bros.; 4 cases marble, to order; 577 steel joists, to order; per Helena, from Goteborg, 6 cases glass, 4 bags turned wood, 5,788 bundles laths, 240 bales mouldings, 390 pieces deals, 1,741 pieces battens, to order; per Penrhyn, from London, 340 tons cement, T. and C. Martin, Ltd.

January 5th, per Lord Lansdowne, from Baltimore, 29 tons roofing slates, 249 pieces oak timber, to order.

January 8th, per Catherine Latham, from Carrickfergus, 125 tons bricks, H. Lavery and Sons; per Jane Rose, from Glasgow, 124 tons bricks and fireclay, T. Archer; per Lady Wolseley, from London, 3 firkins lead, Wells and Son.





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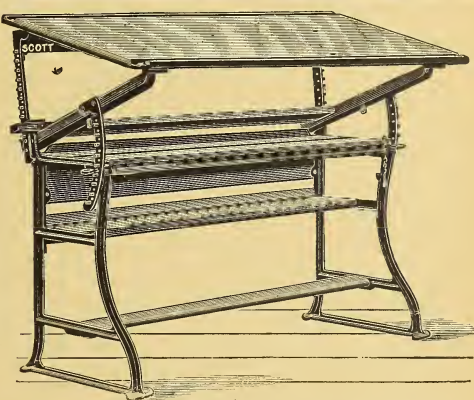
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## LIGHT AND AIR.\*

Disputes arising out of the alleged loss of light and air are amongst the most vexed questions that the architect has to deal with, but the decision in the famous *Colls'* case has put matters upon a more equitable basis than heretofore. Following upon *Colls'* case we find in the second volume of that excellent work, "The Architects' Law Reports," which has just reached us, another most interesting case, in which it appears to be confirmed that "An enjoyment of a special amount of light for twenty years does not confer any right to such special light upon the owner of the dominant tenement. Such owner is only entitled to sufficient light for the ordinary purposes of inhabitation and business."

The case is that of *Ambler and Fawcett v. Gordon*, and came for trial before Mr. Justice Bray in the English King's Bench Division on 14th and 20th January, 1905. The case came before the Court on a case stated by an umpire who had been agreed upon by the parties. It derived an additional element of interest from the fact that the building complained of was a cathedral, namely, St. Anne's new Cathedral (R.C.), Leeds, of which we publish an illustration.

The plaintiffs, one of whom was an architect, were the owners of certain premises in Cookridge-street, Leeds, and the defendant was erecting a cathedral opposite. The plaintiffs contended that it interfered with the light to

which they were entitled, and which had hitherto been enjoyed in connection with their premises, part of which had been used for upwards of twenty years past by one of the plaintiffs, an architect, for the purpose of his offices, including a drawing office, for which a special amount of light was required.

All the lights were ancient, except as to the additional amount of light coming through certain new shop fronts.

A slight but not material interference was caused to those parts of the plaintiffs' premises for which no special amount of light was required.

The plaintiffs claimed that they were entitled to damages in respect of all the premises, and in particular to damages in respect of the special user of the parts used as above stated.

The umpire awarded and found that notwithstanding the defendant's buildings there remained sufficient light to the plaintiffs' premises for all purposes of ordinary user, and the plaintiffs were not entitled to damages for interference with such ordinary user; but if he was entitled to take into account damages which plaintiffs had sustained in respect of loss of light to those parts of the premises used for occupations in respect of which a special amount of light was required, then he awarded £600 damages.

At the request of both parties the umpire submitted for the opinion of the Court the question whether on the foregoing facts he was bound by the decision in *Colls v. Home and Colonial Stores*.

The judge in his decision, after reviewing the circumstances, the arbitrator, Mr. Thomas Blashill, said he had waited until the judgment of the House of Lords had been given in *Colls'* case. The question the judge had to decide was, had the arbitrator power, under all the circumstances, to award damages. The question also arose whether was an architect's business an ordinary one or not, and that cannot be laid down as law one way or another, but must be determined on the evidence. The whole question, according to the learned judge, seems, therefore, to be practically whether the possession of special light for twenty years entitles a man to it in perpetuity, absolutely without diminution; and although there was no positive and clear decision on this particular point really given in *Colls'* case, yet the tone of the judgments was entirely against it. The judge said it appeared to him that in *Colls'* case the judgment seemed to indicate the view that in measuring the quality of light, the purpose for which it is required should be disregarded. Summing up all, the umpire had found, said his lordship, that there remained sufficient light for all ordinary purposes, and accordingly, he said, the decision of Mr. Justice Joyce in *Colls'* case applied, and accordingly he held that the plaintiffs could not be entitled either to damages or an injunction, and he gave direct judgment for the defendants.

This decision is, of course, a most acceptable one to architects, and should help to end a system of blackmail to which almost every building owner was liable. If not changed or undermined by some future case on appeal, it should have far reaching importance.

As already mentioned, we take this case from Mr. Crow's Law Reports, the second volume of which is now before us. We warmly welcomed the issue of the first volume, and we can speak even more strongly of the second, which has been considerably enlarged and improved, a useful addition being some blank pages at the end for news cuttings and memoranda, together with some useful legal notes that cannot fail to be of the greatest utility to architects, engineers, surveyors, and all engaged in building or engineering works. The plans and photos reproduced are of the most admirable clearness and utility, and every architect and engineer should subscribe.

\* The Architects' Law Reports and Interfered. By Arthur Crow. F.R.I.B.A. London: 13, Prescot Street, E. Price 10s. net.

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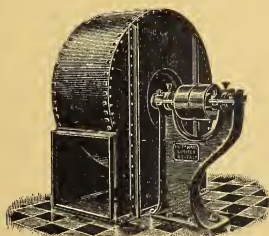
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### COMMENTS.

#### Trade in 1905.

The improvement in the state of employment in the marble and stone trade shows continued improvement we are glad to say. In November last a decided improvement took place, and quite an appreciably greater percentage

United States, Norway, Holland, Belgium, and France sending supplies, while even Portugal, Italy, and Turkey, helping to make the competition in England more severe. To a smaller extent, Canada and Newfoundland compete. It is appalling to think Irish slate quarries make simply no effort to reach the English markets—not to speak of the home demand.



St. Anne's New Cathedral (R.C.), Leeds.

of men were employed last November than in the corresponding period of 1904, which was, generally speaking, an awful year in England, so far as concerns the building and allied trades.

On the other hand, the condition of the slate trade continues bad—wages are reduced, foreign slates are competing boldly in the home market, and year by year England imports more and more foreign slates, the

#### Irish Industries.

At the last meeting of the Irish Industrial Development Association a discussion took place on the refusal of Mr. Walter Long, the late Chief Secretary for Ireland, to interfere in regard to the use of Westmoreland in preference to Irish slates at the new Training College, Drumcondra, and it was decided to approach the new Chief Secretary, Mr. James Bryce, on the subject. We yield to no member

of the Association in our desire to see Irish materials used whenever and wherever it be practical, but surely this is beginning at the wrong end when the architect has made up his mind, when the specification has been written, and contractors have been selected on that basis, in spite of the provisional clause in that specification giving contractors the privilege of providing for Irish slates, a privilege which not one availed of. It seems to us that the natural course would be first to convince architects that they may safely specify Irish slates without the risk of loss of time, temper, and reputation, and in the next place to show Irish contractors that they can adopt Irish slates with credit and advantage to themselves. It must be remembered that contractors are in business mainly for the purpose of making money.

A few months ago we wrote to the manufacturers of a certain commodity used in building which, for obvious reasons, we shall not more definitely particularise, inquiring the price, etc., of their manufacture for a certain job of some extent—also for some indication as to when delivery could be guaranteed. We received at once a courteous reply and a sample, but no definite answer as to our two queries regarding price and delivery. A second application elicited no response, and there the matter rests for the present. The first essential towards success in the promotion of Irish manufactures and products is to begin at the bottom, and to cultivate business principles. There is no "blinking" the fact that the average Dublin builder, favourably disposed as he may be towards Irish manufactures and materials, finds it much easier to do business with the Englishmen. With the contractor time is money—for he carries on business mainly with the object of amassing filthy lucre. The capable, energetic agent of the English—generally an Irishman himself—waits upon the contractor's pleasure: is ever ready to hand on the telephone, or only too glad to "ghost" the builder's office on the smallest encouragement. Prepared at a moment's notice with all those essential elements—price and delivery—is it any wonder the usually patriotic Irish builder shirks the bother of wringing definite terms and undertakings out of our native manufacturers.

#### Trades Dispute in Australia.

An extraordinary case recently came before the New South Wales Arbitration Court, a statutory body established to determine trades disputes in the Colony. The action arose between the Sydney Master Builders' Association and the Sydney Carpenters and Joiners' Union. The employers asked that the minimum wage should be *rs. 4½d.* per hour, and the week's work 44 hours. We say it was an extraordinary case, because both masters and men were before an Arbitration Court who fixed not slave wages, but hours. The papers to hand do not enable us to make out who constituted the Court, but we take it they were men possessed of the necessary technical knowledge, and possessed of such legal knowledge and judicial minds as to make their findings acceptable to both sides.

The President appeared to deprecate the shortening of hours, for he stated that "the shortening of hours would mean that more men would be required to do the same amount of work. It was, in other words, an indication on the part of the claimants that there were a number of workers in this line of business who could not now get employment. The claimants, however, did not propose that they should earn less wages, because they sought an increase in the minimum rate of pay, which would have the effect of making their earnings per week somewhere about the average under the existing conditions. The Court could not grant the demand for the reduction of hours. The minimum wage had been *rs. 3d.* an hour all round. The Court felt a difficulty in dealing with this question. The joiners were clearly entitled to the minimum now given, and about half the carpenters, on the materials put before the Court, were receiving it, the others receiving somewhat less. The joiners and carpenters were one trade, and, though the carpenters formed the somewhat less skilled section, their work was more interrupted, they were exposed to the weather, and they ran a certain

amount of risk. On the whole, the Court had decided to make no distinction, but felt that, if a classification had been possible, a lower minimum might fairly have been fixed for rough carpenters. This was left to be dealt with under the clause relating to 'workers under the minimum wage,' and the Court expected that, on the one hand, the secretary of the union would exercise discretion and not harass men who were really only rough carpenters, and nothing more (and who were compelled to work for a low wage), by bringing them before the Registrar; and, on the other hand, that the Registrar would remember that the minimum wage was not intended to apply to them. All men at present working in the trade who were unable to earn the *rs. 3d.* would find their position recognised by a special paragraph in the clause dealing with workers under the minimum wage. As to preference, the same principle which, when applied in the sawmillers' and wharf labourers' cases, had led to the preference being granted to the unionists, decided that in this case no preference could be granted. The unions formed a decided minority of the whole trade, and though they asked for preference now, seemed never to have asked for it before, and clearly could not have got it if they had."

Mr Wright concurred in this judgment.

Mr. Riley dissented from the award on the two vital points—the hours of employment and the preference to unionists. He considered that the men were entitled to eight hours per day, except Saturdays, which should comprise four hours.

The London County Council have lately bungled another of their precious direct labour schemes under "the Works Department." They entrusted that notorious committee with the task of building a new fire brigade station at Lee Green. When the work was finished numerous cracks showed themselves on the face of the new building, which was, moreover, out of perpendicular, and it is possible the whole thing may have to be rebuilt. It has been alleged that all this is due to a failure of the foundations, but competent authorities are more inclined to attribute it simply to faulty building. Such cases ought to prove the uneconomic and impracticable character of direct labour for complicated or responsible municipal works, but the ratepayers are meanwhile buying their experiences in a dear school.

At a meeting of the Corporation, held on Monday last, the City Seal was ordered to be attached to a document which may almost be described as an historic one. It was an agreement finally determining the connection of Mr. Robert Hammond, electrical engineer, with the Corporation. Mr. Hammond agreeing, in consideration of the payment to him of £2,250, to release the Corporation from all claims whatsoever on his part. Thus ends a connection which extended over several years and gave rise to one of the most heated, not to say embittered, controversies ever brought about by a contract to carry out works. The project has been a most costly one, and in common with many other people, we strongly criticised it at the time. But the work is now done, and criticism would be only carping. If costly, there are, so far, however, grounds for the belief that it will prove thoroughly efficient, and even, let us hope, a blessing in disguise.

#### "MOST USEFUL OF TRADE PAPERS."

Mr. Daniel Murphy, of Market-street, Bandon, writing to us with reference to the IRISH BUILDER, says:—"I am a constant reader of the IRISH BUILDER, and get it fortnightly through my newspaper. I consider it one of the most useful of trade papers."

Mr. Thos. O'Brien, in renewing his subscription, writes:—"The IRISH BUILDER is worthy of all the praise that I can bestow upon it, and still retains its attractive features."

Tenders were recently invited by the Corporation of Winchester for the erection of additional stabling in the rear of the Guildhall. The highest tender was £656, the lowest £360, and the estimated cost £275. This is a pretty fair sample of wide tendering.



### OPENING OF A NEW MOTOR GARAGE IN SOUTH KING STREET.

On the 3rd inst., a very fine new motor garage was opened in South King-street, Dublin. As all our readers probably know, the motor industry, and the popularity of Ireland as a motoring ground, have of late notably increased, and the want of such an establishment has been much felt. With commendable and characteristic enterprise the Messrs. William and George du Cros set themselves to fulfil this want, and on the 3rd inst. they, with true sporting instinct, invited many of their friends in Ireland and not a few from England to view the result of their labours in preparing the premises during the past few months and to join them in partaking of luncheon. Messrs. du Cros were exceptionally fortunate in being lucky enough to secure premises of considerable extent in so central and convenient a quarter; within a few doors of Stephen's Green, they are adjacent to the principal hotels, clubs, and residential quarters, and the chief main high-roads leading out of the city on the south side. De-caying as all our industries are said to be, it is nevertheless a fact that premises such as these are every day becoming more and more difficult to obtain in a central position; that is to say, premises of large extent. Of course, single shops are to be had in plenty, if one be prepared to pay the rent demanded.

These premises, 16 to 18 South King-street, are of the most ample extent, the frontage extending over three houses, and affording space for good plate glass windows for the display of motors towards South King-street and suitable showroom space, while the premises extend to a depth of 123 feet from front to rear. The whole premises have been entirely rebuilt in a substantial fashion. In addition to the showroom already referred to, there is the spacious garage, which we believe is one of the finest, if not the best, in the United Kingdom, in connection with which there is a suitable washing bed of concrete where the motors can be cleaned, with raised and sloped enclosure to retain the water necessarily used. There is also a petrol store of fireproof construction built of concrete. Behind the garage proper there is a well equipped workshop, containing the most up-to-date appliances for the prosecution of this trade, the whole being fitted in simple but extremely complete fashion. There are here two special lathes, the one of English manufacture and the other of the latest French fashion. A large motor pit, long enough to permit of many motors being simultaneously run over it for purposes of repair, has been constructed.

The entire premises are equipped with electric light, generated by the proprietors from their own 16 h.p. Crossley gas engine and dynamo, the contractors being Messrs. Brunker and Robinson, electrical engineers, Dublin. The floor of the garage is of concrete, that of the showroom of ceramic mosaic tiling, supplied through the agency of Mr. Agnew, Burgh-quay, Dublin. The heating is on the low pressure, large bore system, with radiators, and has been most effectively installed by Mr. J. Kerr, of Eden-quay, Dublin.

The premises are particularly well equipped, comprising a store from which all motor parts can be expeditiously supplied. The main roofs are of iron trusses and open to the ridge, the sides being glazed with Rendle's patent glazing. The lighting is with Welsbach patent incandescent arc lamps. The whole of the engine machinery was installed by Mr. Crabtree, representing Messrs. Crossley. The general walling is of brick from the Harold's Cross Brick-works.

After the visitors had viewed the works and listened to some of the interesting details, they sat down to a *recherche* luncheon (Mr. Mills, of Merrion-row, being the caterer), presided over by Mr. W. H. Kingsbury, the Dublin manager for Messrs. du Cros, who were also present to bid their guests a personal and hearty welcome. Amongst those present were: Messrs. M. A. Manning, Town Clerk of Kings-town; Andrew Percy, P. Conway, *Daily Independent*; James C. Percy, J.P.; Fitzjames Russell, George Langley, contractor; Hampden Shaw, architect; the editor IRISH BUILDER; R. J. McCreedy, editor *Motor News*; R. J. Kelly, B.L., editor *Tuam Herald*; T. A. Stoddart, sub-

editor *Irish Times*; George du Cros, William du Cros, W. H. Letts, Charles Jarrott, H. Hunt, B.L., etc., etc.

The toast of the King having been honoured, Mr. Kingsbury proposed the health of the visitors, Messrs. Manning, Stoddart, and Henry Hunt, B.L., responding. The health of Messrs. du Cros was proposed by Mr. J. C. Percy, J.P., who said he had never seen a better equipped garage in the Three Kingdoms. In the course of an interesting speech he reminded his audience that Ireland was not quite so decadent as some people tried to make out. The Messrs. du Cros had tried the expedient of an Irish staff and manager, and it promised to be a successful venture, and they were justified by the fact that we had here the largest shipbuilding, linen, tobacco, shirtmaking, mineral water, distillery, and brewing industries in the whole world, certainly no mean achievement for Ireland.

Mr. George du Cros proposed the toast of the Press, to which Mr. T. A. Stoddart and Mr. R. J. McCreedy replied.

Mr. R. J. Kelly, in proposing "The Motor Industry," said they welcomed any industry which would give employment to the Irish people. The Messrs. du Cros, like the Messrs. Harmsworth, had gone over to England and carved their way to success, and he was glad to see that they had now turned their attention to the homeland with the intention of forwarding its best interests.

Mr. Charles Jarrott, the well-known motorist, in responding, mentioned the interesting fact that Lord Dudley had told him that but for the motor car he would have been unable to see the Irish people at their homes. By its means he had been enabled to visit all parts of the country, and had thus been enabled to appreciate the Irish character at its true worth. A circumstance like that was much valued in motor annals, and tended to strengthen them in their belief as to the great future in store for the motor car. He joined with the other visitors in wishing every success to the brothers du Cros in their Irish branch. Mr. William Letts also responded, and spoke of the fine sporting instincts of their hosts. As a rival in trade he had come specially over from England to give them a good send-off in their new venture, because he knew that they were true sportsmen, without a spark of the jealousy of ordinary trade rivalry, and because he knew that under similar circumstances they would do the same by him. He wished them every success, even if it meant a diminution of his own Irish trade.

In responding to the toast of the visitors Mr. M. A. Manning was in his happiest vein, and made one of his characteristically witty speeches. Recalling old cycling days, and his experiences of the historic Cyclists' Camp at Harrogate, he was imitatively humorous, and demonstrated that the ancient Irish reputation for wit is not nowadays wholly void. Changing from gay to serious he was pathetic and eloquent in his recital of the hapless present state of Irish trade and industry, yet bright and hopeful in his anticipations of a better future which the industry inaugurated that day would help in some degree, at least, to consummate by affording fresh employment for a certain body of workers.

At the conclusion of the luncheon, Mr. Manning started the engine and machinery in the time-honoured way by the breaking of a bottle of champagne.

The general contractor for the works was Mr. George Langley, of Ringsend, and the architect Mr. Hampden W. Shaw, of 5 Westmoreland-street, to both of whom much credit is due for the successful way in which they carried out their work, the work being most expeditiously executed. The demolition of the old premises on the site began in mid-July, 1905, and the entire new premises were handed over complete before the end of the year.

According to one of the building bye-laws of New York all the wood used in the joists, floors, inside window frames, ash doors, and other interior finish in buildings more than 150 ft. high, must be fireproofed. An ordinance was recently proposed to permit the substitution of hardwood for fireproofed wood, but at a meeting of the Board of Aldermen, held shortly before Christmas, a message was received from the Mayor vetoing this proposition. In his message the Mayor says that such an ordinance would do away almost entirely with the compulsory use of fireproof wood in high buildings.



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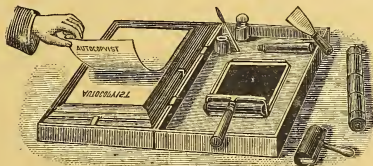
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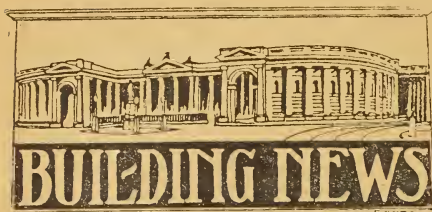
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**Ballynure.**—In the Church of the Ascension, at Ballynure, Co. Kildare, a handsomely sculptured Reredos, in Caen stone, has just been erected. It is in the 15th century style of Gothic art, and represents, in the main, a powerfully modelled representation, in high relief, of the Institution of the Lord's Supper. This panel rests beneath groined canopies, flanked by carved pilasters, whilst beneath, in small and unobtrusive characters, is the following simple legend:—"To the glory of God, and in memory of Francis Bonham, of Ballintaggart, County Kildare, late Major 71st H. L. I. Born 6th November, 1831. Died 20th November, 1892." This pious tribute to one of the bravest officers who ever lived, and erected in the Rev. A. L. Rhind, M.A.'s, Church, is the votive offering of the late gentleman's brother and sisters, and has been carried out and placed *in situ* by Messrs. Harry Hems & Sons, the widely-known Ecclesiastical Sculptors, of Exeter.

**Cork.**—Tenders will be received for building premises in Great George's-street for M. O'Donoghue, Esq. The architect is Mr. Arthur Hill, B.E., M.R.I.A., 22 George's-street, Cork.

The Guardians of the Cork Union received tenders for the execution of works at Carrignavar Dispensary house.

**Dublin.**—A PROJECT FOR SEMI-RURAL HOUSING.—A meeting of the Committee of the Whole House of the Corporation took place recently in the City Hall, the Right Hon. the Lord Mayor presiding. The report of the conference between the Parliamentary representatives of Dublin city and county, the Corporation, and the Trades Council, on the subject of the housing of the working classes came on for consideration. The report, which was published some time ago, recommended, among other things, the building on the outskirts of the city of cottages, and the procuring of cheap means of transit for workers, which the committee believed would not be difficult to arrange with the Tramway Company and railway companies. The provision of these semi-rural dwellings would lessen the congestion in the older parts of the city, and when the pressure on the tenement houses had been relieved the law could be strictly enforced for the condemning and demolition of houses unfit for human habitation, unless they were put into a perfectly sanitary condition. The Committee of the Whole House instructed the Town Clerk, the Law Agent, and Sir Charles Cameron to prepare a scheme embodying the recommendations in the report, so that Parliamentary powers might be sought in the matter.

The two stained glass windows in St. Patrick's Cathedral were unveiled on Tuesday last, which were executed by Messrs. James Powell and Son, are fine specimens of artistic work. One is to the memory of the late Mr. Justice Monroe and his wife, erected by members of their family, and the other has been erected by Mrs. Gilmore to the memory of her husband, Mr. J. F. Gilmore, who was for many years a member of St. Patrick's Cathedral Board.

**Kinsale.**—Tenders will be received for the building of a dwelling house, in accordance with the plans. M. A. Hennessy, Architect, 74 South Mall, Cork. Tenders are to be sent to the Architect on or before the 15th January.

**Lurgan.**—The Rural District Council will, on 1st February, appoint a competent person to supervise, under the architect (Mr. J. W. Walby, C.E.), the erection of twenty-nine labourers' cottages and the performance of incidental work.—William J. Corrier, Clerk of the Council.

**Lurgan.**—The free library which has been erected in Carnegie-street, Lurgan, by a grant generously given by Mr. Andrew Carnegie, was opened to the public on Monday last. It has been erected by Mr. Wm. Callaghan, Maralin, from plans prepared by Mr. Henry Hobart, C.E., Dromore. It is built with brick, and faced with Seagoe perforated red brick, and Aspatia red sandstone dressings, the latter supplied by Mr. McCormick, Antrim-road, Belfast. The several stained glass windows were supplied by Messrs. Campbell Bros., Belfast. The building is heated by a low-pressure hot water system, supplied by Messrs. John Long and Sons, Lurgan.

**Limerick.**—A dispute has occurred in the building trade in Limerick, as a result of which 70 masons are locked out.

**Midleton.**—The Board of Guardians will, on the 13th inst., appoint a competent man as clerk of works at a salary of £1 per week (which is to include preparation of specifications, travelling and all other expenses). The person appointed must devote his whole time to the business of the guardians, and carry out any orders he may receive. The guardians reserve to themselves the right to determine the employment at any time on giving one month's notice.

**Mulranny.**—On Christmas Day the people of Mulranny had the happiness of attending Mass in their new church for the first time. The building of the church and priest's residence was started only last May, and both are now completed, with the exception of some internal plastering and decorations. In form and style the church is suited to the needs of the people of the district, and is also in agreement with the revival in Irish ecclesiastical art and architecture. The general walling is of the local stone, quarried by the poor parishioners themselves, in order to reduce the contract price of the work, and it was they also performed the arduous labour of levelling the site. The church is a commodious one, affording ample accommodation for the needs of the district. It consists of nave, chancel, and sacristy. The total length is 65 feet, and the width across is 25 feet. The nave is spanned by a timber barrel vault, which will be stained Malachite green, and lightly varnished, the principals being picked out in cream colour for decoration. The windows are filled with leaded lights in Celtic patterns. The roofs are covered with small, thick, rough, grey-green slates from the Killaloe Quarries. The cement used is from Wexford county. A feature of the work is the deeply-recessed entrance door-way, and the three-light window over it; and the simple front derives an aspect of solidity and strength from the boldly battered buttress on either side, terminating in semi-circular gables, the whole having a thoroughly Irish and local character. A neat belfry and cross appropriately finishes the front. The contractor for the church, and the glebe house adjoining, was Mr. P. J. Gilmartin, Ballina, of the excellence of whose work throughout it would be impossible to speak too highly. The church and glebe are from the designs and under the supervision of Messrs. Doolin, Butler, and Donnelly, architects. A sweet-toned bell has been obtained, cast by Mr. M. Byrne, Bell Founder, James's street.

**Naas.**—The Naas Urban Council will receive tenders to provide a market place and construct a market-house and other conveniences for the purpose of holding markets; to provide houses and places for weighing carts and cattle; to provide all such matters and things as may be necessary for the convenient use of such market.

**Rathdown.**—The Rathdown Rural District Council, at their meeting on Wednesday last, accepted the tender of Mr. J. J. Doyle, Shankill, for fencing with wire fencing the sites of 70 labourers' cottages about to be erected in the district; also for the supply of new gates, wickets, etc., in connection with same.



#### THE ARCHITECT CROSS-EXAMINED

A good story is told in the "Sheffield Independent" of a Devonshire architect who was a witness in a county court dispute as to "ancient lights." The gentleman in question deposed that the light alleged to have been diminished was really as good as ever, and in proof of his assertion he said he went to the locus in quo with a very small-print book and could read it easily.

Up rose counsel in cross-examination, and the following dialogue ensued:—

Have you that book?

Witness.—Yes.

What is it?—A New Testament.

What part of it did you read?

Witness.—"Woe unto you also, ye lawyers" (St. Luke xi., 46).

Amid laughter the cross-examination came to a speedy close.

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# ENGINEERING SECTION.

## ITEMS.

The greatest satisfaction is apparent in Belfast with the manner in which the electrification of the tramways was carried out, and it is pleasant, the more so, perhaps, because it is unusual to hear that special marks of approval are to be bestowed on the officials concerned. Mr. H. A. Cutler, who has become as popular in the Northern city as he was in Cork, is to receive, subject to the adoption of a recommendation of the Corporation Tramway Committee, tangible recognition of his untiring energy by a grant of an honorarium of £300; while the electrical engineer, Mr. McCowan; the manager, Mr. Nanee; the assistant city surveyor, Mr. Munee; the resident engineer, Mr. Pinkerton; and the clerk of works, Mr. Lewis, are also to receive special grants.

During the execution of the works much extra labour was thrown upon the permanent officials, and many thousands of pounds were saved in consulting engineers' fees. Apart from this, however, the grants will be invaluable, for nothing conduces to energy and good work more than speedy and proper recognition by a public body of meritorious service rendered by its officials.

In designing buildings of ferro-concrete construction, the greatest precautions should be observed to permit the expansion of the floors in case of fire. The simplest method of ensuring safety is to insert fillets of wood around the edges of the flooring, next the walls, and these should be withdrawn when the concrete is partially set. Unless this be done the floor, when exposed to great heat, will push out the walls; in a recent case the side walls of a building were forced five inches out of plumb through this cause. Ferro-concrete construction is of such a character that comparatively thin walls may, and generally are, used, and therefore such a disturbance of equilibrium would be of serious moment.

Whilst on the subject, it is a satisfactory sign of the times to learn that the Royal Institute of British Architects has appointed a commission to investigate the various methods, results and durability of reinforced concrete construction. Co-operation of the Institution of Civil Engineers and the Institution of Mechanical Engineers has been invited, so that the properties and uses of this new material will receive due consideration both from an artistic and scientific standpoint. There is no doubt that the investigations will be thorough, and the data, which will eventually be forthcoming, will be of great assistance to the members of both the architectural and engineering professions.

It is practically certain that unless some untoward accidents occur the new method of construction has come to stay. In these days when every inch of ground in the overcrowded cities is of the utmost value, and when expansion of premises has necessarily to be sought in an upward direction, any material with which the thickness of walls may be reduced and which permits of the erection of homogeneous buildings to enormous heights has a wonderful field before it. There is only one point upon which fears are expressed, and that is the durability of the encased metal in exposed walls, and this can only be properly ascertained by the test of time. Concrete is, as is well known, anything but a damp proof material, and unless special precautions are taken there is little to hinder wet permeating the concrete casing and eventually corroding the steelwork within. Engineers who look with favour on reinforced concrete state, as an argument against such a probability, that the con-

crete sets up a chemical action with the steel, and forms a coating, which acts as a permanent protection. This assertion is rather dogmatic, and cannot well be refuted for many years to come. It is certain, however, that cement applied to iron is the best possible preservative, provided that the material is of the best, and proper care is taken in the application. All ferro-concrete enthusiasts point out the absolute necessity for selected materials and thorough workmanship in carrying out buildings of the class, and it therefore behoves any engineer who may experiment with this construction to see that his work is properly supervised.

Through the courtesy of Mr. Olsson, we recently were afforded an opportunity of inspecting the plant of the Economic Safety Gas System of incandescent lighting at the premises of Messrs. W. Coates and Son, Ltd., 5 Leinster-street, Dublin. This firm are the sole makers and licensees for Ireland. The system is extremely novel, economical, and easy to manage, and should prove most useful in country houses, hotels, convents, schools, and other buildings where a gas supply is unobtainable. Electricity for such purposes may be left out of consideration owing to the initial cost of the plant and the annual charge on the production. The cost of electric light on the incandescent system, if taken at the extremely low rate of 2d. per unit, when produced by the consumer, would be 7½d. per 1,000 candle power per hour, as compared with 1½d. per 1,000 candle-power per hour with the Economic Safety Gas system.

The apparatus consists of a small hot air engine with patent burner, which drives a "Roots" blower. This blower forces air over a thin layer of petrol in a carburetter, and during its passage over the petrol the air absorbs a certain amount of the vapour, the mixture thus formed being the illuminant. The mixture, after its formation, is conveyed into a small gasometer, where it is stored for use, the service pipes being led thence to the various positions required, as with ordinary gas. The apparatus is so designed as to be entirely automatic, the gas produced being regulated in quantity to that required by means of valves controlled by the rise and fall of the gasometer. As various burners are lit and the gas is consumed, the gasholder sinks into its water seal, opens the valves controlling the gas to the hot air engine, which thereby gaining speed and accelerating the blower, forces more air over the petrol and manufactures a greater volume of gas. As the gasholder fills a reverse action comes into operation. To start the apparatus the fly wheels of the hot air motor have to be turned for a few revolutions in order to obtain the initial supply of gas for the burner.

The gas is in so dilute a carburetted mixture that it cannot be lighted at an ordinary burner, but special tube burners at a cost of 2s. each and cotton or platinum mantles at a cost of 2s. 6d. per dozen have to be used. The burners are manufactured to give from 30 to 300 candle-power. The greatest precautions appear to have been taken to prevent possibility of leakage, but the gas is so weak that should such leakage occur there is absolutely no danger of explosion. The gas is also non-poisonous. The installation, which was in operation at our visit, and which cost £50, was for a 40 light service, and the area it occupied was five feet by three feet six inches over all, by about five feet in height. The consumption of petrol, for obtaining lights aggregating to 1,000 candle-power, is one pint per hour. Two important points were noticeable, firstly, there was no observable smell from either burner or plant, and, secondly, that the mixture, being self-burning, does not consume the oxygen of the room. We have confidence in recommending architects and engineers to call at the premises of this Company and see the apparatus for themselves.

At the Dover Harbour Works some striking results have been obtained from the use of the Tasmanian blue gum, which is probably the most durable timber in the world. It will sustain double the weight which can be borne by English oak and will regain its elasticity even after subjection to loads equal to the breaking weight on oak. Its specific gravity is 1.2, and it perfectly withstands that terror of all marine engineers, viz., the teredo. The chief value of the blue gum when used at Dover was in the piling operations, for whereas Oregon pine piles could not be sunk in deep water without being first shod with iron, no difficulty arose with the former timber owing to its weight. Owing, also, to its imperviousness to teredo attack and its enormous strength, it could be retained in continuous use for years, indeed in some cases the same pile has been redriven in three or four different positions.

One of the burning questions of the hour with municipal authorities throughout the kingdom is that of deciding on the most durable and economical paving material. The inhabitants of Gwandu, in Africa, have solved the latter part of the problem by using the skulls of their enemies for paving the approaches to their town. More than twelve thousand skulls are used to form the roadway, and these, polished to whiteness by the attrition of countless feet, form a most picturesque and attractive thoroughfare. It may be assumed that their county council is never in any difficulties as to the ways and means for effecting repairs. On the report of the surveyor that such have become necessary, war is declared on some neighbouring tribe, preferably the most hardheaded available, and presently the worn out pavement is replaced by a new one, without consequent increase in the rates.

The Arterial Drainage Commission has now commenced its proceedings at 24 Kildare-street, under the chairmanship of Sir Alexander Binnie, the secretary being Mr. S. W. Strange, of the Irish Board of Works. Amongst the witnesses already examined are Mr. Vesey Fitzgerald, senior counsel to the Board of Works, Ireland; Mr. J. H. Moore, County Surveyor, Co. Meath, and Mr. Edward Glover, County Surveyor for Kildare. The latter was strongly of opinion that the watersheds of Irish rivers should be placed under the County Councils affected and managed by a joint committee on which there should be representatives of the local districts affected. Under the Local Government Act, the transfer of drainage districts to the County Councils can be effected voluntarily, but Mr. Glover is of opinion it should be rendered compulsory. He thought the rivers of a county should be under the control of the same body which has charge of the roads.

It is anticipated when a certain amount of evidence has been heard in Dublin, the Commission will transfer its headquarters to the various districts affected, and carefully examine the situation and requirements on the spot.

We understand that Mr. Bryce, Chief Secretary, will interview the members of the community this week.

#### TENDERS.

**Carlrow.**—Alterations and renewals at Fever Hospital for the Board of Guardians. Engineer, Mr. James O'Donnell, A.M.I.C.E., Carlrow.—Thomas Thompson and Son, Carlrow, £64 13s. 8d.

**Cork.**—Erection of dwellinghouse and shop on Western-road. D. J. Buckley, Esq., C.E., M.R.I.A.I., 15 Marlboro'-street, Cork, architect.—John Kearns, Cork, £520; John Nagle, do, £480; Timothy Buckley, Mylare, Ovens, and Lee-road, Cork, £470 (accepted).

**Dublin.**—Tenders for New National Bank, Arran Quay. J. F. Fuller, architect.—Collen Bros., £4,000; R. Mellon, £3,930; John Pemberton, £3,918; Laverty and Son, £3,840; Conolly and Sons, £3,790; Toole, £3,723; Bolton, £3,650; B. Pemberton, £3,615; Good, £3,600; Crampton, £3,589; Farquarson, £3,550; Shortall, £3,534; McLoughlin and Harvey, £3,525; Joseph Pemberton, £3,473; Donovan, £3,390.

#### CHIMNEYS WITH WATER TANKS.

There is a tendency in modern engineering, caused, no doubt by the keen competition which is going on in all branches of industrial activity, to concentrate various purposes into one appliance. Thus we find mechanical devices answering two or more different purposes, where, in earlier days, as many separate appliances were employed.

The combination shown in the accompanying figs. owes its existence to considerations of this nature. Whilst a reserve supply of water under pressure would be a desirable object in the designing of power plants, the idea is very often abandoned as the provision of such a supply would require a separate water tower.

By putting a tank round the chimney the latter takes the place of a water tower, whilst fulfilling its function as a draught producer and smoke stack. Fig 2 shows a section of the arrangement.

A represents a course of dressed stone to support the tank. B is the water and C a space between the chimney stack and the water to permit of repairs. Tanks holding 250,000 gallons have been affixed to chimneys of 150 feet, at half the chimney's height, and the heavy load considerably enhances the stability of the entire structure.

The idea has found friends on the Continent and in the States, where many such tank-chimneys are in practical use. Messrs. Heinrich, Winby and Co., Specialists in Chimney Construction, of 20 King William St. London, E.C., devote special attention to these particular chimneys, as well as to chimneys of the more usual design.

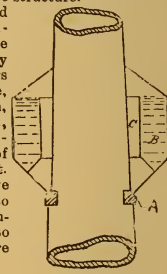


Fig. 2.

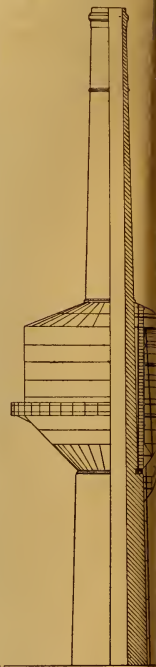


Fig. 1.

#### ENGINEERING NEWS.

**Ballinasloe.**—The Council of this District will receive tenders for maintaining a constant supply of water to the town of Ballinasloe.

**Dungarvan.**—The Rural District Council made an order that an engineer be advertised for to carry out No. 4 Cottage Scheme.

**Fermanagh.**—The Proposal Committee of the above Council received tenders for the ventilation of County Council Chamber and secretary's office.

**Kildare.**—The Board of Guardians of Naas Union will, on 17th inst., consider tenders for the carrying out of the necessary works in connection with the lighting by electricity the Kildare Dispensary and part of the medical officer's residence according to specification.

**Limerick.**—At a meeting of a special committee of the Corporation last week, it was decided to recommend the Borough Council to appoint Mr. Maurice Fitzgerald, who has been employed in the City Surveyor's department for the past 18 years, as permanent Assistant City Surveyor.

**Londonderry.**—The Committee of Management of Londonderry District Lunatic Asylum advertise in our columns to day for tenders for sinking a well at Gransha. Specifications, etc., to be seen at the office of Mr. M. A. Robinson, C.E., Richmond street, Londonderry.

**Leitrim.**—RAILWAY EXTENSION IN THE WEST.—In connection with the proposed railway extension between Leitrim and Roscommon, for which a sum of £25,000 was set aside by the late Chief Secretary out of the Irish Development Fund, Mr. Joseph Tatlow, general manager of the Midland Great Western Railway, states that the directors view favourably the question of an extension at Drumsna or other suitable point on this system, and provided the plans were approved of by them, and the line constructed to their satisfaction, they would be prepared to work it on terms to be arranged.

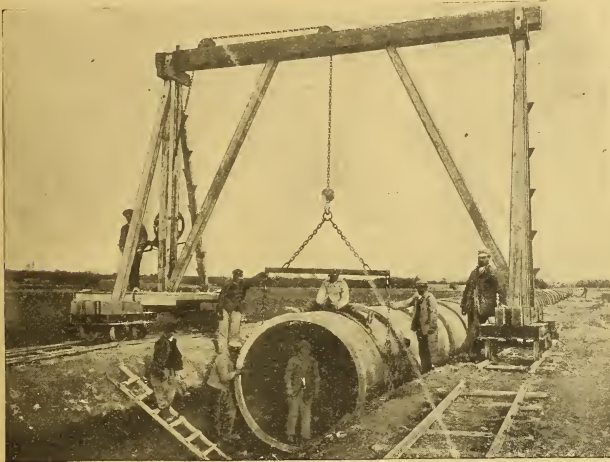
**Midleton.**—The Local Government Board have directed their Inspector, A. D. Price, Esq., M. Inst. C.E., to hold a local inquiry into the application for a loan of £1,600 for the purpose of extending the water supply of the district.

**Newbridge.**—The Board of Guardians will, on 17th January, consider tenders for the execution of the necessary works in connection with the laying on of a hot and cold water supply to the dispensary residence.



### REINFORCED CONCRETE PIPES. The "Bonna" System.

The application of reinforced concrete or armoured cement for all purposes of construction has for very many years been general in France, which has been the home of this system of building, as well as in other parts of the Continent of Europe. During the past decade it has made rapid strides in Great Britain, more especially with regard to the erection of buildings,



Laying Pipes and Fixing Collars in position.

this application being now very largely adopted for roofing and flooring where great strength combined with fire resisting qualities are necessary. In America also, constructional engineers have recognised the merits of reinforced concrete, many of the largest buildings in the United States being erected on this principle, of which we gave a notable example (the new chapel for the U. S. Naval Academy at Annapolis) in a recent issue. Recognising for these reasons the vast importance of this system which seems destined in the future to

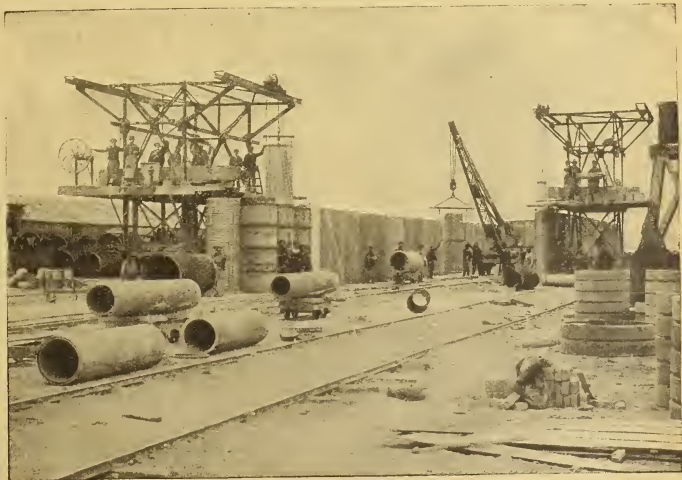
revolutionise the principles of building construction, we have in the course of the past year devoted a considerable amount of space to explanations of the various systems of armoured concrete now in vogue, and our readers are therefore by this time tolerably familiar with the main features of this method of construction. Briefly the principle of reinforced concrete consists in embedding and distributing in cement steel bars in such a manner that each of the materials mutually strengthens and protects the other, the steel bars supplying the tensile strength while the cement protects the former against rust and distortion. The combination of steel and cement possesses the following advantages:—(1). The elongation or contraction under varying temperatures is practically equal in the case of each material. (2). The fire and frost resisting qualities of cement are very great, and being a non-conductor of heat affords protection to the steel. (3). Steel bars increase the elasticity of the surrounding concrete to a very large extent, owing to the steel causing a more even distribution of the strains. (4). Cement adheres very strongly to the surface of steel, thus excluding air and rendering the steel impervious to rust, in consequence of which the original strength is preserved. (5). Cement does not deteriorate, but increases in strength and hardens with age.

From a consideration of these qualities it will be noticed that, in addition to its value for constructional purposes, armoured cement is in every way suitable for the manufacture of pipes, especially for those of large diameter, and in cases where they are required to resist high internal pressure, and as a matter of

fact during the past ten years the system has been very largely applied on the Continent, but more especially in France, to the construction of pipes for the conveying of water and sewage. One of the most successful and best-known systems of armoured cement pipe construction is that known as the "Bonna," which has been purchased for Great Britain by the Columbian Fireproof Company, Ltd., of 37 King William-street, London, E.C., one of the pioneers in this country of reinforced concrete for

general constructional purposes. The investigations by this company of the "Bonna" system have extended over three years, during which the process has been carefully watched and studied, with the result that the Columbian Company are now introducing the "Bonna" system, with every confidence that it will attract the attention of engineers, surveyors, and municipal bodies, owing to the many advantages this method possesses over that of iron or steel pipes, or even brick culverts. In these days great attention is being paid to such matters as sanitation and water supply improvements, which, as ratepayers are only too well aware, are necessarily of a costly character. Municipal bodies are, therefore, frequently debarred from carrying out such works, owing to (a) the initial cost, (b) the cost of upkeep owing to corrosion in steel or iron pipes, and (c) the consequent additional burden on the rates. The "Bonna" system considerably reduces these, as follows:—(a) Reduced initial cost, the installation of armoured cement being cheaper and equally strong; (b) there being no corrosion or leakage the upkeep is reduced practically to nothing; and (c) the rating under these conditions would be considerably less.

The adoption of these pipes was begun about twelve years ago, by the municipality of Paris, since when some 250 miles have been installed, both for high-pressure water and sewage. They vary in diameter from 1 ft. to 12 ft., and as nearly all the water and sewage pipes in Paris are laid in galleries there has been no difficulty in constantly inspecting and taking careful note of their lasting qualities. In every case it has been found that under continual pressure the cement pipes have remained perfectly dry and sound, the cost of upkeep being nil, while to prevent leakage riveted steel pipes have to be constantly watched and painted. The result is that new contracts are con-



Pipe Manufacture, showing Armoured Skeletons, Completed Pipes, Collars, &c.

stantly entrusted to M. Bonna when any alterations are necessary or when old iron or steel pipes are worn out by corrosion.

The method of construction of "Bonna" pipes is as follows:—For pressure pipes an inner tube of sheet steel is first built up. This tube, while acting as a factor of strength, prevents moisture from penetrating to the outer layer of armoured cement before the pipe is thoroughly matured, and becomes perfectly hard. Upon this tube a collar is welded at each end, which ultimately forms the flange of the pipe for jointing up. Spirals of + bars

are then wound round this tube, both externally and internally, these being secured by longitudinal + bars tied transversely. The armoured skeleton so formed is then placed in a vertical position, a core being inserted internally and a cover externally, sufficiently spaced so as to form a mould to give the required thickness of the intended pipe. Cement mixed with sand to the consistency of grouting is then poured in, and when sufficiently dry the inner and outer casings are removed. The pipes are then allowed to dry thoroughly before being placed in position. The jointing of pipes naturally forms a most important part of any system, as it is obvious that without a perfect joint the whole would collapse. In the "Bonna" method great attention is, therefore, devoted to this most vital point, and in no case has the "Bonna" joint ever failed. Each pipe is constructed with rabbeted ends, which are placed together, when a preparation of bitumen is run in, giving a certain amount of elasticity to the joint. Armoured cement rings, which have been previously placed loosely on the pipe, are then adjusted equally all round the joint, cement is run in, and the joint thus completed. Junctions, tees, bends, etc., are constructed on the same lines as straight pipes. When large contracts are being carried out, the pipes are invariably made in their entirety on the job, the mixing plant being moved on rails from pipe to pipe. When a sufficient quantity has been made, the trench is excavated at the beginning of the pipe line; the pipes are then laid and jointed, and the ground filled in as in the case of iron or steel pipes.

The Columbian Co. will have much pleasure in sending their representative in the pipe department any distance in order to furnish such further particulars as may be desired, feeling confident that the "Bonna" system of armoured cement pipes, when thoroughly understood, should open a new era in the construction of sewage, drainage, and water conveyance.

#### HANDBOOK OF CONSTRUCTIONAL STEEL.

Messrs. Redpath, Brown and Co., Limited, 2 St. Andrew-square, Edinburgh, send us a very useful and well arranged handbook of constructional steel as manufactured by them.

It gives a clear introduction dealing with girder sections, which affords information as to the proper selection of sections so as to yield the most economical results; and some practical examples of calculations are indicated. The great defect of most girder books is the want of variety in the sections, so that one is often forced to specify a section heavier than is really needed. In the book before us this is not so; the engineer has wide scope for choice.

The details of construction given are most practical and useful. The miscellaneous tables of sectional areas, moments of inertia, grillage foundations, roof trusses, and tables of powers, logarithms, reciprocals, circumferences, and circular areas, trigonometrical expressions and functions, etc., are of a character such as we never before remember to have seen collected together in one book of the kind. In short, apart from its merits as a very complete catalogue of steel work it is a most valuable work of ready reference.

Engineers and architects will find this section book of incalculable utility in designing steel work, owing to the extreme facility with which reference may be made, and information as to the basis of calculation laid hands upon with the minimum expenditure of time and trouble.

The sections of girders illustrated in the book are "British Standard Sections." Most of the weights and sections shown are rolled to the standard of the British Engineering Standard Committee, and these weights and sizes are now accepted and rolled by all the principal makers. This should popularise a system that has been of the greatest utility and economy in America and on the Continent. The book is thoroughly up-to-date, compiled with great care and should be of service to all interested in such matters.

Mr. John McNeill, Ocean Buildings, Belfast, is the Irish representative of Messrs. Redpath, Brown and Co., and he will be glad to send a copy of the work to any architect or engineer who does not already possess a copy.

The Royal Sanitary Institute have arranged to hold examinations in Sanitary Science as applied to buildings and public Works, and for Inspectors of Nuisances (under the Public Health Act, 1875), in Dublin, on May 25th and 26th, 1906.

The United Service Club, Pall Mall, London, has lately been undergoing a thorough renovation. The whole of the important sanitary fittings were supplied by Mr. George Jennings, Ltd., while the Otis Elevator Company supplied the electric passenger lift.

#### NOTES ON HOT WATER SUPPLY TO BATHS.

The piping should be kept 2 feet away from cold water pipes, and painted three coats oils where exposed and two elsewhere. The piping in and around range, it is generally held, should be copper, though some authorities say copper

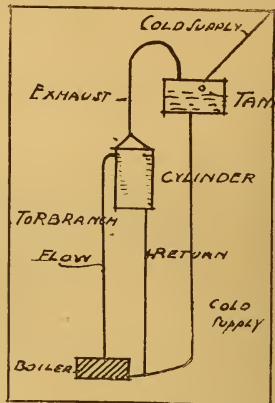


Diagram of Hot Water Circulation.

possess no advantages. The remainder may be wrought iron, welded steam tubing, or heavy lead. Joints should be made in red lead, and the tubing fixed to walls with wall hooks, and to wood-work with iron bands. All the pipes should be laid to falls, so that the whole may be emptied. Where the piping touches external walls it is well to have it bound round with silicate felt on dry hair-felt and canvas. As regards the hot-water system itself a quicker and better supply is obtained by putting the cylinder near the boiler rather than far

#### VELOGRAPHY.

This is the name given to a new method of reproduction, and it is so called on account of the speed with which copies may be obtained. It is claimed that by this process fifteen or twenty copies of one double elephant tracing can be obtained in less than an hour, which is certainly a high rate of speed. Velography copies, being printing ink, are permanent, and the material on which they are made is untouched by any acids, chemicals, or even water. As to price, we are informed that Velographic copies are not more expensive than photo print copies, and they can be made in very large sizes, it being possible, for instance, to make a copy in one size without a join up to 84 ins. by 40 ins. Full particulars and specimens can be had on application to Messrs. Norton and Gregory, Ltd., Castle-lane, Buckingham Gate, London, S.W.

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## ARCHITECTURAL ASSOCIATION OF IRELAND.

## Lecture on Ventilation by Sir Charles Cameron, C.B.

A meeting was held on Tuesday evening in the rooms of the Association, Frederick-lane. The president, Mr. Harry Aliberry, occupied the chair, and there was a fair attendance.

Mr. Herbert Waller was elected a member of the Association, and Messrs. C. A. Owen, Samuel Kirker, and Francis O'Loughlen were nominated for membership.

Sir Charles Cameron then delivered a lecture on "The Ventilation of Workshops and Dwellings." He emphasised the importance of the provision of fresh, pure air in all buildings, pointing out that failure in this respect renders people more liable to infection owing to the lowering of the tone of their system. He explained that in order to properly purify the air used by each adult nearly 40,000 cubic feet of fresh air per day is required. Dealing with the systems in use at the present day, the lecturer divided them under two heads, "plenum," or artificial, and "vacuum," or natural. He explained the advantages and disadvantages of each. He referred to the working out in Lancashire cotton mills of the Acts existing as regards the ventilation of factories, and said that although in many cases it was found possible to easily keep the proportion of carbonic acid gas down to .08 per 10,000 cubic feet of atmosphere, the proprietors of the Lancashire Cotton Spinning Factories had petitioned the Home Secretary to have the statutory maximum raised from .09 to .12. He stated that one gas (Argand) burner will vitiate the air to as great an extent as four persons, and said that this ought to be taken into account in calculating the amount of fresh supply necessary. The lecturer also showed a cowl invented by Mr. Rochford, Irish Lights Board, of Kingstown, which he thought would be very useful in many cases, especially with regard to sanitary work.

Amongst the many practical points mentioned by Sir Charles were, that his experience of the "plenum" led him to believe that inlets at or near the ceiling level, and outlets near the floor level were the most effective method of ventilation, and preferably, to secure the best results, the inlets and outlets should be on the same wall. He said it was impossible to lay down any hard and fast rule as to the number of renewals of the fresh air per hour needed in various buildings, such as factories, theatres, and hospitals. It was impossible to maintain theatre atmosphere at the standard of purity demanded for factories, because of the way people were packed, but the presence of carbonic acid in excessive proportions was not here so dangerous as in factories or workshops where people spent so much of their lives. It might, however, be taken for granted that unless under very exceptional circumstances any more frequent change of air than seven times per hour would lead to unpleasant draughts.

He threw out the suggestion that in cases where great economy was necessary, and where at the same time it was impossible to get the occupants to allow the ordinary course of ventilation to pursue its natural course without interference, then brick walls unplastered in the inside offered advantages of economy and healthfulness, because bricks were pervious to the atmosphere, and an enormous amount of filtered air could get through a brick wall. He also suggested the simple method of ventilation by means of a false sill to windows, and also by the insertion of some sort of fire-clay plaques in the external walls of schools, etc., which had the advantage of not being capable of being easily tampered with.

Ventilation inlets should, theoretically, have an area of 32 square inches per 1,000 cubic feet, but in practice this was seldom reached; the outlets should be slightly larger in area than the inlets.

Sir Charles Cameron unhesitatingly recommended the "plenum" system for large, troublesome areas, though of course, natural ventilation was usually more economical, but the "plenum" had been an unqualified success at the Royal Victoria Hospital, Belfast. One of the speakers, Mr. Beckett, mentioned that he had found that the plenum system might be very suitable for certain conditions, but that it needed much attention, the ducts being frequently carriers of dust and dirt. Another speaker pointed out that this might be due to the inlet being at or near a place liable

to be contaminated by floating dust and dirt in the air, or more probably to the inlet chamber having been accidentally allowed to be in communication with the general premises, whereby the air is drawn back into the inlet chamber, and with it the dust. He pointed out that in a dirty city atmosphere it was difficult to keep a cocoa fibre filtering screen free from clogging.

Sir Charles concluded a lecture of absorbing interest and great practical value with interesting experiments, showing the movements of various gases, methods of testing for carbonic acid in the atmosphere, etc. Owing to Sir Charles speaking entirely extemporarily, we regret we are unable to publish more than this brief abstract of his remarks. Those who allowed themselves to be deterred from attending by the somewhat inclement weather missed a treat, and a very useful opportunity of learning something really practical and valuable that could not fail to be of utility to them in their profession.

Mr. Beckett proposed a hearty vote of thanks, which was seconded by Mr. Hudman, and passed with acclamation.

## A TIMBER PRESERVATIVE.

## Pilchers' "Stoprot."

Messrs. Pilchers, Ltd., Morgan's Lane, Tooley-street, London, S.E., are amongst the largest manufacturers of paint in the United Kingdom. Amongst their many specialities are their metallic oxide paints which are noted for their purity, covering power, dense body, and lasting qualities. They form excellent preservatives for wood and iron exposed to atmospheric influences, giving an impenetrable and adhesive coating. They have for these reasons been found particularly suitable for iron-work, in proof of which it may be mentioned that some of the principal London bridges have been painted with them, including the Tower Bridge, Blackfriars, Southwark, Battersea, and Richmond Bridges, also Holborn Viaduct and the Smithfield Meat and Poultry Markets, the last named being, with the exception of the Crystal Palace, the largest painting contract in London, and consuming no less than 70 tons of paint. Another of their specialities is their Galvanizing Silver Paint, which is quick drying, non-inflammable, and a perfect galvanizer. Being unaffected by sea air or sea water, it is specially recommended for use on board ships, piers, and in coast towns, and amongst other places where it has been employed is Llandudno Pier, where it has displayed great lasting qualities, and is much admired.

The principal one, however, of Messrs. Pilchers' manufactures with which we are concerned at the moment is their "Stoprot." It is claimed for this preparation, and as far as we can judge the claim is well founded, that it is an absolute preventive of decay and dry rot in wood, and as it is of moderate cost, it is a preparation which we have much pleasure in introducing to the notice of our readers. One of the advantages of Pilchers' Stoprot is that the wood does not require to be impregnated with it. It is simply used like paint, and may be applied either cold or hot, but as it soaks deeper into the wood, and dries quicker when hot, it is advisable to use it this way when possible. Wood so treated on if desired be painted, but this is not necessary, as the Stoprot gives a rich brown colour equal in appearance to oak stain, and is just as effectual as a preservative when exposed as when covered with paint. As to covering qualities a recent trial proved that a gallon covered 400 ft. super. of new boarding. Messrs. Pilchers have received the most flattering testimonials from architects and builders throughout England and elsewhere, fully sustaining the claims they put forward for their "Stoprot." It has been supplied for use at Windsor Castle, to the Admiralty, and to some of the principal estates in England, and has also been recently applied to the Infantry Barracks at Tonca, Chili. Messrs. Pilchers will be glad to forward price lists, testimonials, and sample of treated wood on application.



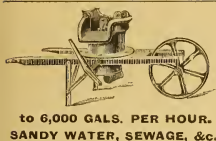
Messrs. E. H. Shorland and Brother, of Manchester, have just supplied their patent Manchester grates to the Hadlow Schools, near Tonbridge.

## FOR SALE.

57 Wrought Iron Built Girders for Sale, short time in use, good as new, varying in lengths from 13 feet to 33 feet, widths from 8 $\frac{3}{4}$  ins. to 12 $\frac{1}{2}$  ins.; depths from 1 ft. 3 in. to 2 ft. 3 in. Also a few Box Girders.

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### CONTRACT.

#### TO WELL SINKERS.

The Committee of Management of Londonderry District Lunatic Asylum is prepared to receive TENDERS from competent Persons for SINKING A WELL at GRANSHA 75 feet deep, finishing 10 feet inside diameter, in accordance with Specification, etc., to be seen at the Office of Mr. M. A. Robinson, C.E., Richmond street, Londonderry.

Pers.,ns tendering are to state in their Tender the Names of Two Solvent Sureties who will be willing to join them in a Bond for the due performance of the Contract.

Tenders, sealed and endorsed, "Gransha Water Supply," and addressed to the Resident Medical Superintendent, to be lodged in the Boardroom, Strand Road, Londonderry, at or before TEN o'clock a.m. on FRIDAY, 19th JANUARY, 1906.

The Committee does not bind itself to accept the lowest or any of the Tenders.

(By Order),

S. HAIRE,

Clerk of Asylum.

Londonderry, 3rd January, 1906.

AGENTS AND TRAVELLERS—Wanted suitable and qualified gentleman to wait upon Municipal and Civil Engineers, Water and Gas Engineers, Architects and Surveyors, to represent a firm having a New and Universal Pipe joint used for Water and Gas Mains, Sewers, Drains, etc. Address in confidence to Box 1216, office of this Journal.

AN EXPERT QUANTITY SURVEYOR is open to give assistance in preparation of Architectural or Engineering Quantities, taking-off, squaring, abstracting, and billing. Quick and accurate work; moderate terms. Reply M.C., this office.

CEMENT WORKS—Engineer and Manager will shortly be disengaged, who has knowledge of latest methods and ideas, Rotary and other Kilns. Would reorganise works with up-to-date plants, or would meet capitalists to form Company which will give large profits. "Cement," "Irish Builder."

CLERK OF WORKS AND BUILDERS' FOREMEN, preparation for the position or Certificates by Correspondence; also Carpentry Certificates. Penny stamp for particulars and results. Geo. Ellis, F.B.I.C.C., 59 Woodlands Road, Ilford, Essex. Result C. of W. exam. November 25th, 3 medals, 10 firsts.

M.R., San. I., etc., Leveller, Surveyor, and Draughtsman; experienced in sewerage construction, etc. (England), desires post as Assistant in Civil Engineer's Office. Box N, I.B.



## THE CHARING CROSS DISASTER.

In our recent issues we have commented upon the appalling accident which occurred at Charing Cross Station on the afternoon of December 5, but we have awaited the subsidence of popular excitement and the publication of facts connected with the occurrence before dealing with it in detail. The station was designed by the late Sir John Hawkshaw, who was also responsible for Cannon-street Station, and was completed in 1860. The roof consists of fourteen principals of wrought iron, and was constructed by Messrs. Cochrane, Grove and Co., of Dudley. The axis of the station lies north and south, the open end facing south and the area covered by the roof measures 490 feet by 166 feet.

Owing to the position of the station, with reference to the adjoining streets, and the height of the walls, it was impracticable to employ abutments by which the thrust of the roof could be sustained, and a self-contained arched truss was erected. A description of this is of interest, and the scantlings given are taken from the *Builder*. The curved main rib of each truss is a wrought iron plate girder, with a rise of 45 feet and a clear span of 166 feet, the east end of which is fixed to the stone cap of the supporting pier, while at the western end an expansion joint is formed by means of a suspension link saddle. The curved rib is 18 in. deep, with a web  $\frac{1}{2}$ -in. thick, and top and bottom flanges each formed of two 6-inch by 3-inch by  $\frac{1}{2}$ -inch angle bars, and it springs at a height of 40 feet above the platform level. To prevent thrust against the outside walls the main rib is trussed, the chief members being vertical struts at eight points, dividing the roof into nine panels; diagonal ties in each of the inner seven panels; and a tie bar forming the lower member of the whole truss, to which the struts and the diagonals are attached. Each strut consists of two 6-in. by 3-in. by  $\frac{1}{2}$ -in. tee bars bolted together, and each diagonal of a 4-in. by  $\frac{1}{2}$ -in. flat bar, provided with cotter and gibs for tightening purposes. Similarly a gib and cotter joint is formed at each end of the tie rod near the springing of the main rib.

The tie rod, the breaking of which was the first indication of the impending collapse, is made up of nine lengths, one to each panel, the diameters of which are as follows:  $\frac{1}{2}$ -in. in the end panels,  $\frac{3}{4}$ -in. in the second panels,  $\frac{1}{2}$ -in. in the third panels,  $\frac{3}{4}$ -in. in the fourth panels, and  $\frac{1}{2}$ -in. in the centre panel. The junction of each section is formed by an enlargement in cross section, threaded and screwed into coupling boxes.

The purlins, sixteen in number, consist of lattice girders 10 $\frac{1}{2}$  inches deep, with webs of 2-in. by  $\frac{5}{8}$ -in. bars, and flanges formed by two  $\frac{3}{4}$ -in. by 3-in. by  $\frac{1}{2}$ -in. angle bars, the lower flanges bearing on the bottom flanges of the main rib and being bolted thereto. The purlins are stiffened by transverse braces two to each bay, and the greater part of the segment of the roof is glazed on tee bars.

As mentioned, the first indication of the disaster was given about 3.30 p.m., by the snapping of the tie rod of the first truss from the west end at a point one-third of the span from the west wall, that is, in the third panel with a  $\frac{1}{2}$ -in. diameter rod. The separation was accompanied by a loud report, which was distinctly heard in the vicinity, and which attracted such notice that steps were immediately taken to apprise the men engaged in the repairs of the roof. For fifteen minutes the truss, with the tie bar broken, gradually sagged, as the remaining members became subjected to the newly-developed strains, until at 3.45 the principal collapsed, pushing down some 80 feet run of the upper part of the western wall of the station and thus causing the huge wind screen at the southern end of the station to fall. That the disaster was not more sudden and extensive is a convincing testimony to the merits of the general design, construction and materials used. At the same time it must be confessed that some inherent defect must have suddenly developed in the tie rod, owing either to improper welding, by which such a long and heavy member would have necessarily to be manufactured in 1860, or by a newly developed stress-caused extraneously. An examination of the fracture would lead to the former conclusion, as the collective area of the three portions of the section representing sound metal is barely 6.09-in. out of a total of 15.0 sq. in. The surface of the metal elsewhere bears a very corroded appearance, and the side elevation of the fracture resembles a scarf weld.

What is of equal interest to the engineer is, however, the general condition of the iron work, and this assuredly leaves something to be desired. The surface of the tie rod was corroded to a depth of  $\frac{1}{4}$ -in. in places, and other members of the truss and the wind screen had suffered severely. The most marked example of deterioration was

to be found in the web of the main rib, originally  $\frac{1}{2}$ -in. in thickness, and which has now diminished to a thickness of little more than 3-16-in. Several holes were apparent right through the web, and the paint work generally could be readily peeled off and the corroded iron beneath exposed to view. The railway authorities were undoubtedly aware of the dilapidated condition of the roof, and steps were already in progress to scrape, paint and overhaul the metal work to prevent further disintegration. Now that the damage is done it is obvious that such steps would have been inadequate to render the roof perfectly safe, but probably, during the minute examination to which it was about to be subjected, its dangerous condition would have been observed. In lamenting the serious mortality that occurred in connection with the disaster, and the damage to the station itself, comparatively little thought has been given to the havoc wrought in the Avenue Theatre adjoining. The reconstruction of this building was practically complete, and the redecoration well in hand, when, in the space of one minute, all the past labour and expenditure went for nought, and the collapse of the west wall of the station, before referred to, will necessitate the major portion of the work being recommenced. The auditorium and portion of the stage is now one tangled mass of iron and steelwork, mingled with huge masses of brickwork. The stone template, weighing about  $\frac{1}{2}$  tons, which supported the fallen truss, fell on to the stage, where the weekly meeting of the contractors, sub-contractors, and the architect was about to be held. So enormous was the thrust of the mass of material that the walling facing Northumberland-avenue is now leaning 4 in. out of plumb, and the cornice is buckled in, out of line. An engineer, surveying the ruin, can only wonder that the collapse ceased at the stage it did, and that the remainder of the western wall did not fall when subjected to such a severe strain, bringing with it the adjoining trusses.

When the final reports are issued more accurate information as to primary causes will be forthcoming, but sufficient evidence is already to hand to show how treacherous steel construction may become, when subjected to atmospheric influences and allowed to deteriorate through want of incessant attention, cleansing and painting. The interior of the box girder of the wind screen, which is unexposed to the weather, is in perfect condition, as far as could be seen, and this fact is somewhat reassuring to those architects and engineers who have been designing in steel encased in damp excluding material. The accident will doubtless tend to greater care being taken in steel design and construction and the maintenance of such structures, and doubtless engineers in this country, who have charge of such works, have already taken the necessary steps to pass them under a thorough and searching examination. While the safety of the public may be endangered on one occasion with a certain amount of impunity owing to causes, for the non-observance of which weighty excuses can be proffered, a second catastrophe would tend to excite public alarm, and the officials in charge would incur a very heavy responsibility after having such a clearly defined object lesson placed before them.

Since writing the foregoing, our conclusions as to the cause of the disaster have been verified, as, in evidence given at the adjourned inquest, Sir Benjamin Baker stated that no damage was apparent in the supporting walls or piers, and that the collapse was entirely due to a defective weld. This could not be apparent until the tie rod had snapped, as to all outward appearance it would be in perfect condition. Whilst the remainder of the roof is probably sound, having regard to the recent occurrence, it would be a wise policy to do away with the tie rods, which are not of a standard that would, with the introduction of modern methods, be passed by engineers of the present day.

Messrs. J. Duthie and Co., 120 St. Vincent-street, Glasgow, sent us a list of important new buildings specified to be done in "Duresco." From the number of contracts we take the following, from which will be seen that "Duresco" is appreciated in the home of its manufacture:—Turnberry Hotel, for G. and S. W. Railway, Girvan; Samaritan Hospital addition, Glasgow; Scottish Provant Buildings, Glasgow; Edinburgh and East of Scotland Agricultural College, Edinburgh; Civil Service and Professional Stores, Edinburgh; Govanhill Public Library, Glasgow; Barnhill Poolhouse, Glasgow; Kingsseat Village Asylum, Aberdeen; Colinton Mains Hospital, Edinburgh; Omoa Asylum, Omoa, N.B.; Royal Infirmary, Glasgow; Gresham Buildings, West Nile-street, Glasgow; Central Station extension, Glasgow; Three Public Schools, Aberdeen; Scottish Temperance Buildings, Belfast; Carnegie Library, Hawick, N.B.; Carnegie Library, Falkirk, N.B.; Carnegie Library, Bo'ness, N.B.; New Anchor Line Buildings, Glasgow; North British Station Hotel, Glasgow; Macgregor Memorial Church, Govan.

# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,

ARTS AND HANDICRAFTS.

Every Second Saturday.

[Estab. Jan. 1859.]

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HEAD OFFICE

JANUARY 27, 1906.

34 LOWER ABBEY ST.,  
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Price 1d

## TOPICAL TOUCHES.

Mr. John Beardwood, of Johannesburg, sends us a snap-shot of the Catholic Club which has lately been completed there from his designs. We hope shortly to reproduce a rough sketch of it, as the photo does not lend itself well to reproduction. The building is an imposing looking structure, and the membership totals 1,500.

Mr. Dixon, the Co. Surveyor of Mayo, the other day asked his County Council to pay £18, being the interest on the capital he proposes to expend upon a motor car which he will use in the discharge of his official duties. The request seems a not unreasonable one, but one of the members remarked that "he thought they should provide an airship." No decision was come to.

So quiet are things in Belfast that our correspondent there assures us that there is absolutely nothing to write about! This appears to be the universal complaint amongst architects and builders. We hear, however, that in England things are looking up very much; possibly when the turmoil of a General Election has passed and we have all settled down again after the excitement, the architectural sky may look brighter.

In this issue we publish a plea for the statutory registration of architects by Mr. Robert Elliott, who is well known as a critical writer on art matters. Mr. Elliott writes as one outside the ranks of the professional architects, and therefore uninfluenced by the spirit of "trades unionism" that is so often levelled as a charge against the advocates of this reform. We publish Mr. Elliott's statement not because architects are unable to voice their own opinions, but because it may be helpful to hear the views of one from outside, who yet thoroughly understands the question, and is only influenced by the desire to promote the true interests of art.

A memorial is to be erected in Dublin to the Dublin Fusiliers who fought in South Africa, and "foremost fighting fell." The matter is, we understand, in the hands of a committee who have obtained a design. We heard a very strong rumour a day or two ago that a design has been submitted, if not already accepted, by a *Scotch* architect, whose fame, on this side of the Channel at all events, has yet to be proclaimed; that it is to be in the form of a Roman triumphal arch, as an entrance to Stephen's Green, and is to be erected of *Scotch* granite. As a memorial to brave Irishmen, paid for by Irishmen to ornament the Irish capital, the affair borders perhaps more on the pathetic than the humorous. At the same time, if rumour be true, we make the manager of the Royal Pantomime a present of this latest and best local "allusion." We would further suggest to this eminently patriotic committee, that a triumphal arch is often crowned with a quadriga or a similar group of statuary. To make this Scotto-Romano memorial still more cosmopolitan, the quadriga could be replaced by a Dublin Fusilier in kilt and bonnet, armed with spear and shield, standing in a Russian drosky. With an inscription and dedication in Chinese we feel confident that there are but few who would comprehend what it is all about.

Sir Charles Cameron, C.B., the medical officer of health for Dublin, has asked the Corporation to convene a representative meeting of Urban District Councils to consider the establishment of a sanatorium for the treatment of consumptives in the Dublin district. Sir Charles was authorised to convene a meeting.

A public meeting of the ratepayers of Charleville was held the other day, and a resolution was passed calling upon the Local Government Board to hold an inquiry into the refusal of the Urban Council to provide a proper water supply for the town. A motion to appoint an independent engineer to report upon the water supply was defeated at a meeting of the Council a few days previously.

The British Wall-Paper Manufacturers, Ltd., send us a copy of their report for the year 1905. This combination, which was formed partly for the purpose of combating the influx of low-priced German papers on the English market, has, considering the bad state of trade, a prosperous year, inasmuch as after payment of income tax, interest on debenture stock and preference shares, there remained available for further appropriation £290,727 12s. 2d.

Some time since the Arklow Harbour Board invited applications from engineers for appointment to design and supervise the harbour extension works. Over one hundred replies were received. One of the conditions of the appointment was that the candidate appointed should satisfy the Lord Lieutenant as to his fitness for the work. Owing to the enormous number of applications, the local authorities seem to have become somewhat bewildered, and decided to submit twenty names, leaving the ultimate selection to His Excellency.

The London County Council have just made a loss of £2,000 over the manufacture of £6,000 worth of bricks, a line of business they have lately embarked into with signal want of success. According to the "British Clay-worker," although the bricks made are of the most inferior quality, they are now actually being sold by the Council to one of their own contractors. The "Clay-worker," by the way, adds "that every member of the claymaking fraternity prays fervently that he may never again see the counterpart of 1905. Not only was trade no better than 1904, but far worse."

The Architectural Association Committee is still working away at the schemes for the promotion of a museum of manufactures and products used in building, and at the education question. Good progress has been made with the latter problem, the sub-committee charged with the inquiry into the matter have already gone into it very fully, and a syllabus of study outlined. The course is designed to prepare students for the examinations of the R.I.B.A. Hitherto the defect in the A.A. classes was that they lacked co-ordination, and led up to nothing definite; they are admirable in their way and calculated to be of the utmost benefit to students, but they never succeeded in attracting any number of students. The programme has not yet been put formally before the members, nor has it



even been adopted by the Committee, but the sub-committee have prepared a most exhaustive report and outline scheme. Of course, it depends entirely upon the students themselves the measure of support they are prepared to accord to it, whether the scheme will be carried through or not. The following is a brief outline of what is proposed:—

**Syllabus**—Courses in Building Construction, 3 years; courses in Architecture, 3 years; Studio, 3 years.

**Time Table**:—Monday, Building Construction, 6.30 to 8 (1st year's course); 8 to 9.30 (2nd year's course). Tuesday, Studio, 6.30 to 7.30. Thursday, Architecture, 6.30 to 8.0 (1st year's course); 8 to 9.30 (2nd year's course). Friday, Building Construction, 6.30 to 8 (3rd year's course); Architecture, 8 to 9.30 (3rd year's course).

## REVIEWS.

### A Useful Book of Reference.

London: Waterlow Bros. and Layton, Limited, 24 and 25 Birchin-lane, E.C.

Messrs. Waterlow Bros. and Layton, Limited, have sent us a copy of "The Architects and Surveyors' Diary and Almanac for 1906." It contains a calendar for the year, a diary, 3 days to a page, and a host of useful information for builders, architects, and surveyors. In addition, there are articles on the London Building Act, 1894, and the Amending Acts of 1898 and 1905; Redemption of Land Tax, Commutation of Tithes and Tithe Rent Charges, Poor Rates and Assessments, Law Relating to Actionable Nuisances, Light and Air, A Digest of the Principal Acts Relating to Buildings, Conditions and Contract on Taking Building Land, General Conditions for Building Contracts, Professional Practice and Charges of Architects, Practical Table and Calculations for Estimating and making Valuations; Banking, Insurance, etc., etc. It is bound in cloth, and published at 3s. 6d.

### Double Entry Book-Keeping for Builders.

This handy little volume is one of the "Mechanics' Manuals" Series, published at 6d. each by Messrs. Cassell and Co., Ltd., and edited by Mr. Paul H. Hasluck, editor of the *Building World* and other technical journals. It contains a comprehensive digest of the knowledge of Double Entry Book-keeping required by builders in a form admirably adapted to the requirements of their business. In the opening chapters the general theory and practice of double entry book-keeping are fully explained and illustrated by numerous examples. The author then goes on to treat of the double-entry system as adapted to the clerical work of a builder's business. A list is given of the necessary books, and the correct method of keeping all of them is fully dealt with in the succeeding chapters, every detail being explained, with copious examples, from the starting of a business to the drawing up of a balance sheet and profit and loss account. Useful chapters are added on the checking of builders' accounts, and on commercial terms. The publication will be found very instructive and useful to builders and those engaged in their offices, as well as to all students of book-keeping.

### Who's Who. 1906.

We have received from Messrs. Adam and Charles Black, Soho Square, London, W., a copy of that most useful work of reference, "Who's Who"—a work that has not been inaptly termed the "Debrett' of the Intellect." It is published at 7s. 6d. net, or in full limp leather, with gilt edges, round corners, at 10s. This year's issue contains over 20,000 biographies, and the value of the book is greatly enhanced by the fact that every biography has been submitted for personal revision. The work has increased in size from year to year, but by the use of suitable abbreviations the present volume is compressed into 1878 pages, notwithstanding the fact that the value of the book has been greatly increased by the insertion of the motor and telephone numbers and telegraphic addresses.

The following biographies of Dublin architects are included in the issue of 1906, and being, we understand, written or approved by the subjects themselves are presumably correct:—

Drew, Sir Thomas, Kt., cr. 1900; LL.D., Dublin, 1905; architect; F.R.I.B.A.; Pres. of Royal Hibernian Academy since 1900; b. Belfast, 18th Sept., 1838; son of Rev. Thomas Drew, D.D.; m. 1871 Adelaide Ann d. of William Murray, a former architect of H. M. Board of Works, Ireland; pupil of the late Sir Charles Lanyon, C.E., architect, 1854; Consulting Architect

to Christ Church and St. Patrick's Cathedral; Pres. Royal Institute of Architects of Ireland, 1892-1901; Pres. Royal Society of Antiquaries (Ireland), 1895-97. Address: 22 Clare street, Dublin, Gort-na-drew, Monkstown, Co. Dublin. T.A.: Drew Dublin. T.: 375. Club: Royal Societies.

Fuller, James Franklin, architect, author; Fellow of Society Antiquaries of Royal Institute of British Architects and of Royal Institute of Architects of Ireland; b. 1835 m. Helen d. of J. P. Gouvion, and g. d. of General Gouvion (St. Cyr) of Napoleon's army; one s. one d. His principal professional works are—Churches of Clane, Arthurs-town, Killadease, Rattoo, Kylesmore, Syddan, Rathdaire, etc., etc., Lord Ardilaun's mansions at St. Ann's, Dublin, and Ashford, Co. Galway; Harristown House, Kildare; Ballyhurler House, King's County; Mount Falcon, Co. Mayo; Lord Ventry's, Co. Kerry, etc.; he is architect to the Church Representative Body, to the Honourable the Benchers of King's Inns, and to the National Board of Education. Publications—"John Orlebar," "Culmshire Folk," "The Young Idea," "Dr. Quodlibet," and "Chronicles of Westerly"; has been a frequent contributor to genealogical and heraldic periodicals, such as the "Miscellanea Genealogica et Heraldica," "The Genealogist," and "Walford's Antiquarian Magazine." Recreations—Genealogy and Heraldry. Address—Glassnacree, Kenmare, Co. Kerry; Brunswick Chambers and Lissatier, Eglinton-road, Dublin.

Murray, A.E., A.R.H.A., F.R.I.B.A., F.R.I.A.I.; architect, b. 11th May, 1849; 2nd s. of late William George Murray, R.H.A., Avonmore, Co. Dublin, and M.A. (d. of James Craig, of Armagh); m. 1902 Amy H. Johnston, o. d. of Andrew Johnston, Dublin. Educ.: privately. Hon. Sec. to the Royal Institute of the Architects of Ireland, 1883-1901; Examiner in the Diploma of Public Health, Royal College of Physicians, 1887-96; Hon. Sec. Military Lodge (Masonic) of Ireland since 1883; extensive practice, and consultant to many hospitals, which latter work has been a special duty. Recreations: fishing, golf, sketching. Address: 37 Dawson Street and 2 Clyde Road, Dublin. Clubs: Royal Irish Yacht, Northern Counties, Londonderry.

The Statistical tables are now published separately as "Who's Who" Year-Book at 1/-

## CORRESPONDENCE.

### FLAT ROOFS.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—We observe in your correspondence column to-day a communication in respect to the above.

Have you seen our Lead and Bitumen damp course and sheathing, a sample of which we enclose?

It is cheap, and its life is endless. Egyptian mummies have been kept in their bitumen bandages for 5,000 years, and lead we know.

A great deal of it is used for Government and other work. —Yours, etc.,

WATSON AND CO.

Riverside, Barnes, London, 13th January, 1906.

### ROADS AND THEIR MAINTENANCE.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—I was interested in the very valuable paper you published from Mr. Cowan on the above subject, but I regret to find one distinguished writer on the subject is not named.

I may mention that I have 1,063 miles of main road under direct management, and employ 16 steam rollers, and try to become proficient in road management. I agree in the main with everything contained in the article, except that the most important Irishman that has written on the subject is not mentioned.

I have in my possession a very old book by Leahy, an Irish engineer, printed and published at Cork about 1840, containing by far the best information of any book I have seen, and what no other work on roads contains.

I write this in justice to an eminent Irishman.—Yours truly,

ROBERT PHILLIPS,  
County Surveyor for Gloucestershire.

Messrs. Young and Marten, Ltd., Caledonian Works, Startford, London, issue a neat little catalogue in which special attention is drawn to a few of their specialities consisting of the following:—Mantel registers, self-setting ranges, baths, lavatory stands, gates, and railings, and portable washing boilers. A list is also given of the trade discounts, which will be allowed by the firm on their various goods during the present year. The catalogue is got out in handy form for sending through the post, and will prove interesting to those engaged in building operations.



## THE PROFESSION OF ARCHITECTURE IN IRELAND.

By ROBERT ELLIOTT.

The Architect is always with us. Though, wherever we find one stone stressed by another we find evidence of the Builder, to find evidence of the directing mind, of the man with ideas of service and plans of utility, we look at the whole rather than at a part. But there was a time when the Architect was a practical builder himself, a mason, a *magister lapicida*, and sometimes a monk or a canon regular to boot. Some times, too, a great painter, or a sculptor, like Giotto, or Michael Angelo. To-day, the Architect is neither; he plays his part upon our little stage as the necessary brain of the Builder, who sometimes is lacking in that particular; and the Architect who is (at his worst) "nothing better than a frame-maker on a large scale," is the average Architect which destiny has presented us with to-day. And still long-suffering beauty lingers in odd corners!

As have the conditions under which he worked, so the type of olden Architect passed away. Perhaps the so-called Renaissance was responsible for our modern house-designer, as he may be termed. Anyway, he has multiplied upon the face of the earth; and, as in many other callings he has specialised himself, and it seems inevitable that he should go on doing so. In Ireland, in Great Britain, on the Continent, the Architect is what we agree to term a professional man, a man with special qualifications and training.

Now, whether we consider this specialisation deplorable or not, whether we love the modern Architect or not, it is at least lamentable that many inferior men, who are anything but "professional" in practice, or in conduct, or Architects in training or in knowledge, should have usurped the title of "Architect," just as, years ago, unprofessional, illiterate, and often barber-ous men, assumed the title and practice of surgeon and doctor of medicine. When at length the profession of medicine awoke to the disabilities which it had allowed to fall upon it by sailing in the same boat with those who practised the science of extracting fees without studying any other kind of science, energetic doctors agitated for, and ultimately succeeded in getting through Parliament—despite jealousies and factions—a statute which has ever since kept the status of medical doctor and surgeon on a plane of respect and dignity. Architecture is now, in Ireland and in Great Britain, in somewhat a similar position to that in which medicine found itself fifty years ago. And should the analogy seem weak by reason of medicine being a science and architecture a creative art, it is strengthened by the reflection that there is, in domestic and commercial architecture, so much practical science, that the word art has almost lost its special significance.

It is hopeful to find that the majority of Architects of any standing as professionals are fairly united in a demand for some statutory protection; but, unfortunately, there are several men in London of great reputation and of high position in the profession who are lukewarm, or either quite cold or opposed to the project. They are—and one or two of the chief among them would be—a serious obstacle to the successful introduction of the necessary reform. A man may be an artist as well as a great architect (and he can hardly be the latter without being the former), and nothing irritates the artist so much as talk about qualifications and examinations and registrations. But, unfortunately, the majority of Architects periodically attached to public institutions and local councils, etc., as well as of those with private practices, have not the freedom that a great architectural artist has won by his exceptional genius; and it would be too much to expect more than half a dozen really great Architects in a generation. They are compelled, these scores of humbler men, to submit patiently to the abuses which are harassing them more and more every day for want of some statute, some compulsory registration; some power to check even a foreman road-mender from setting up as an "Architect" to equally ignorant district councillors. Mr. G. Hubbard, M.A., F.R.I.B.A., has touched upon this point of obstruction to the wishes of the majority of Architects outside London, in his paper on the "Statutory Qualification of Architects" read before the Royal Institute of Architects of Ireland.

and before the Society of Architects, London, several months ago. "In any case," he says (after referring to the temporary appearance on a roll of the highest names in the profession with those of men practising as architects, however incompetent, who have by reason of such practice, a "vested interest" right to be included in the roll), "the foolish pride of the few should not be allowed to stand in the way of a great reform advantageous to the profession and to the country." By "country," Mr. Hubbard means, no doubt, the two countries of Great Britain and Ireland. He does not refer to Ireland; but architecture in Ireland is in a more deplorable state than in England. In the absence of an Irish legislative chamber, architects in this country will have to look to the British Parliament, of course. That is one of the blessings of Imperialism which they, in common with all Irishmen, enjoy; and it is quite certain that some of them enjoy it to excess. It is twenty years now since the first Bill for the Registration of Architects was drafted; and Irish architects are, presumably, quite resigned to their fate, and will cheerfully wait for their sop in the "United Kingdom" pan.

Now, on this subject of Statutory Qualification, everybody knows well enough that there have been great professors of faculties whose greatness would not have been increased one jot or tittle by the legal recognition of them as qualified professionals; and, let us hope there will always be such men. A Dr. Abernethy (nor Aesculapius himself) would have acquired any more fame had his name been inscribed on a Statutory Medical Roll; and Inigo Jones, and Wren, and Chambers; and those who in recent years have designed many fine buildings, would not have added one more laurel leaf to the wreath of fame had they been legally enregistered as architects in accordance with some discriminating statute. Neither will registration add a whit to the fame of any lesser man. But this is a question of protection, and of the prevention of imposition. The few great ones in any profession are not fairly representative of that profession; and half a dozen famous architects in London do not supply but a very small part of the architectural needs of the peoples of these countries. There are hundreds of other architects (and qualified assistants) worthy professional men, and some of them deserving the greater title of artist, who have no power to prevent any charlatan, any quack "architect," any carpenter, or bricklayer, tired of manual labour (as it is termed), any assistant "surveyor" with road-mending qualifications, from appropriating the design of a professional architect, and (in Ireland especially) assisted by the stroke of a pen of some chairman of District or Urban Council, set up in the ready-made professing of "architecture." Such may demand, or accept, any fee which he personally considers fit—whatever the Architectural Institutes and Societies may say about it—and legally claim the title of "architect" without one grain of moral right to it. Probably the carpenter and the road-mender, as well as the chairman of Urban or District Council do not see the need of Statutory Qualification. Probably the ratepayers do not trouble about the matter at all. But the architect who has studied the art and profession of architecture all his life, who has been trained long years, not alone in construction but in that often neglected matter of design, and, perhaps, above all, has diligently studied those principles of beauty and taste in a course of wider experience than superintending jerry building in a suburb—he sees a very great need of some statutory protection of his vested professional interests. He may have seen a rival applicant for a post employed as clerk of works on one of his own buildings; for contractors sometimes employ carpenters and bricklayers as such; and he may one day see a replica of a design of his being erected by the Council created "architect," and he may soon hear his own name coupled with that of the quondam carpenter or bricklayer (or, maybe, road-menders' ganger's supervisor (called an "assistant surveyor") as the two architects of the town. There is generally little discernment among the general public in matters of architecture, and if the quondam artisan add a few stock "ornamental" bricks or tiles to his edition of the design he is sometimes held to be the greater "architect" of the two.

It must be admitted, however (though as no valid argument against Registration), that an intelligent mason or bricklayer could not possibly do worse at house designing than some of our professional architects have done. But in large works the constructional training of the qualified professor of the Ugly could not be dispensed with without dangerous consequences to the community—outside the sphere of art—and in practice it seldom or never is by private or public institutions. But the intelligent artisan, with ideas

and with years behind him of private and useful study, will be protected by a statute, such as is contemplated. But in protecting such an one, who has practically qualified himself outside societies and institutions, it shuts the door against the unqualified charlatan. The intelligent artisan may become an architect—there is nothing to prevent him; but as a matter of protection of the vested interests of the qualified professional of the future, who will give hostages of articles, and technical training, and competitive examinations, and qualifications granted by the representative Institute in Great Britain and Ireland, and often expensive study and travel abroad, give hostages such as these to personal fortune, this matter of registration is approached by the writer of this plea for it.

It takes about ten years to make an architect, and he has some right to expect that the law will protect him from the competition of any tradesman, whose only idea about architecture is that it consists of the ability to construct a brick arch, or to hang a foreign window sash. It is also a subsidiary question of protecting the public, however indifferent they may be to it. We all have to contribute toward the cost of public buildings, and a large section of the public contribute toward the erection of churches and schools; and, of course, private dwelling houses are important to the general public, for they have to live in them as well as pay for them.

The public, when they need a doctor, go to a man with a brass plate on his hall door, which plate signifies—or guarantees—that its owner is a qualified medical practitioner registered according to Statute. If he wrongly entitles himself doctor or surgeon, the public, as well as the medical profession, can check his career of imposition. A solicitor could not practice a day if he were not on the roll. But anybody can put a brass plate with "architect" after his name on his front door, and nobody can question his legal right to do so, or do more than point out that last month he was measuring up heaps of stones for the road makers, and so forth, if his brass plate interests him as a ratepayer who is helping to support the newly-fledged "architect." Architecture, though years of study and training are necessary before one can qualify himself as an Associate of the British Institute (the accepted examining body in these islands at present), is not a close profession like so many others; so there is an open door, as well as a brass plate, and face, for any charlatan who has a fancy to enter the profession after an interview with a few District or Urban Councilors. The public are protected in the case of a pseudo-doctor of medicine (a *rara avis* to-day), or of a lawyer attempting to practice after being convicted of unprofessional actions, etc.; but the public are not protected at all from the charlatan practising as an "architect," or from the mispractices and unprofessional conduct of a qualified architect. If such have designed buildings defective in every particular, and dangerous to reside in, or even to stand near, they cannot be legally restrained from continuing their practices; there is no roll off which to strike the professional delinquent, and no Statute to prevent the incompetent from practising. A member of an Institute or of a Society of Architects can be expelled, but that does not affect his position as a practising architect at all.

The only remedy for this lamentable state of affairs is Registration and Statutory Qualification. It is not a question of art, and it should not be approached from that standpoint. If architects who are, and would be, considered artists do not wish for this reform, still there is little doubt that the majority of trained professional architects do; and even, did they not approve of a Parliamentary Bill, it would be any but an unwise proceeding for the Government to introduce some measure of reform despite them; a thing, by the way, it will never do, so long as there is no public interest in the matter.

Medicine, which has been reformed, is a noble profession; but I do not know that architecture is not as noble; and it certainly is the more necessary one of the two. Many civilised and healthy men go through life without the assistance of the medical doctor, but no man can exist in comfort without that of the house-designer. An incapable house planner makes the need of the doctor more apparent, and if the public want to see their doctor's bills diminished they might do worse than unite their voices to those of the architectural profession who are agitating for reform. The daily press should approach this question, and ventilate it with the winds of discussion.

My own voice, I, as one of the public who has not yet taken to the tent, or to the hollow tree, or to the mountain cave, and therefore have to reside under imported Baltic rafters and American slates, unite with the majority of architects in demanding unequivocally the registration of all in the profession who have proved themselves, and shall in future prove themselves, worthy of that title of architect, now rapidly becoming dishonoured through the apathy, or opposition, of a few selfish men in London.

### CHEAPER COTTAGES IN RURAL DISTRICTS.\*

It will be remembered that the subject of "Cheaper Houses in Rural Districts" was touched upon by our Past President (Mr. Walter W. Thomas) in his inaugural address last year.

It may appear a small matter to bring before a Society like this, to discuss how to design a simple commonplace house, or to build a labourer's cottage. The subject has, however, come much to the front lately, and has engaged the attention of landowners, farmers and others, as being of considerable importance, not only to the labourers, but as regards the very existence of the most important of our industries, that of producing our daily food from the land. Much of this food can be purchased cheaper from abroad than it can be produced here, and the result is to reduce wages, and allow the labourer to drift. It has long been noticed that men are leaving the country districts and going into the towns to look for more profitable employment and better house accommodation for their families. Some who leave are no doubt disappointed in their quest: the large majority do not return, but settle down in the already over-crowded town districts. This is most unfortunate for both masters and men—to say nothing of the land, which requires constant attention to make it productive and profitable to work.

### The Want of Housing Accommodation.

From all we hear, the want of better house accommodation appears to be a great drawback to keeping men in the villages, and goes far to show the need of trying to do something to meet this difficulty, or want, by adopting a more simple mode for providing better houses, so that the rustic labourer can look forward to more comfortable homes, for "home-life" is appreciated much more in the country than in the towns. This would doubtless, in time, create a feeling of contentment, especially if the labourer could have a good sized plot of land near, to give him occupation for his spare time, and a general interest in his surroundings. Various efforts have been made, mostly I believe by large landowners to provide better accommodation for their work people of the higher class, such as gardeners, gamekeepers, woodmen, and others employed on their estates.

### Pretty Dwellings.

Very pretty dwellings are often seen as one travels through the country, which form very charming villages, but the houses often appear to have been built regardless of cost. The owners of such property are deserving of all praise, and are to be congratulated for providing such dwellings for their dependents. Such buildings, however, cannot be taken as models to meet the want under consideration, viz., the ordinary farm labourer's cottage. And why has this want not been met? I fear the answer is that it does not pay to build such houses, in other words, the low rents obtainable do not give a fair return on the outlay or cost of erecting them. To solve this problem is the object of our discussion this evening, and I hope that ideas may be suggested that will lead to some more simple and cheap form of construction being formulated for the guidance of those interested in providing suitable habitations for the class so much in need of them.

### The Utility of Concrete.

As architects, we should not think the matter too insignificant to try and work out some arrangement by which the cheapest suitable materials may be put together with the smallest amount of skilled labour possible, as it is in the labour that the saving is likely to be effected. It goes without saying that the design (if I may use the word) must be of the simplest form in order to bring the work more within the scope of the labourer to carry out, and to use the material of the district in which the cottages are required. To carry out this idea, I would suggest concrete construction of the simplest possible form, as the aggregate for this material can generally be found on the land in the form of gravel, broken stones, or burnt clay ballast, which might be collected and prepared by labourers when other work is slack, and the same men, with very little instruction, could make the concrete and fill in the trenches for foundations, and in

\* By Mr. J. R. Manning. Read at a meeting of The Society of Architects, December 14th, 1905.



moulds for walls. The framing of the moulds could be set up and shifted from time to time by an ordinary country carpenter, who is generally a very handy man, able to do almost anything. Concrete steps, heads and sills for windows, and jambs for fire-places could also be made in moulds during bad weather, or odd times when the labourers have nothing else to do, and thus provide work for the unemployed. In this way, rough strong walls (and the ground floors) might be formed with the cheapest materials and labour. This concrete construction, as already remarked, would require the simplest possible plan for the houses. Walls set square, without projections for bay windows or porches, and I would suggest angle fire-places grouped together in the centre of the building, all carried up in one chimney stack. This would economise material and space, and keep the heat in the houses better than when placed on the outside walls.

Fire-places in bedrooms might be left as recesses without grates or chimney-pieces, but having sunk concrete hearths for burning faggots, rough blocks of wood or peat fuel. Failing the foregoing, oil stoves could be used in case of illness, as a can of oil is more easily obtained in the country than a sack of coals. Such recesses would also be found useful for standing a pail or other receptacle for water, liable to be upset, whereas being on a sunk hearth would prevent leakage to the rooms below. A thick wooden shelf fixed above the recess would answer all requirements of a mantel.

The kitchen should be provided with a portable self-setting range (but no boiler), and the living or sitting-rooms fitted with a hob or other simple grate. The ground floor to be formed with concrete rendered smooth. The sitting-room only to have a boarded floor laid direct on the concrete. The bath, sink, and part of the setting for copper could also be formed of concrete, the waste pipes being 3 in. glazed stoneware built in during formation of the walls, as shown on the drawing. By using concrete, good solid fire-resisting and weather-resisting walls could be built at a cheap rate, as only the cement would have to be obtained from a distance, thus very little carting would be required, and the labour would be of the cheapest kind.

#### Simple Roofing.

The roofs should be of single span or lean-to, thus dispensing with complicated labour required for bay and dormer windows, or return gables involving hips and valleys, with the usual waste of material, and considerable extra labour on timber and lead work, as also in the slating or tiling. Pantiles are about the cheapest covering for plain roofs, and do not require much skill in laying, and last a long time.

The external appearance of a building constructed thus, would doubtless be somewhat rough and rustic, but with a little assistance from Nature the walls could soon be covered with ivy or other greenery forming a pleasing contrast with the red tiles, and would, I think, be more in harmony with the usual country surroundings, and better adapted to the requirements of the class of people who are to live in them, than the slight ornamental houses often seen, and which appear very much out of place.

#### Internal Convenience.

Internal convenience should, however, be considered more than external effect. My idea is that the interior should be severely plain, but every nook and corner utilised, and everything strong and not likely to get out of order. For this reason, I would avoid hung sashes in cased frames, and panel doors, and have casements and ledged doors, hung in solid frames, set and built in as the walls are formed, keeping the heads of frames or lintels close up to the ceiling for better ventilation of the rooms, and to act as plates for the first-floor joists. They could be held in position with angle or "T" irons fastened on the top of the whole length of the walls, to which the joists could be notched.

#### ronmongery.

I would dispense with locks and complicated fastenings likely to get out of order, and have Norfolk latches and barrel bolts for all doors except those to front entrances, and wrought-iron hooks and eyes to the casements. The stairs should be in one flight without winders, and enclosed with

inch matchboarding to save balusters and newels. Match-board partitions save space; are not desirable between rooms, but can be used to form passages or cupboards off the rooms. Cupboards should be lighted and ventilated with iron gratings, or perforated zinc where possible.

#### Water Supply.

Water supply in country places is often difficult to obtain. It is, therefore, desirable to catch as much as possible from the roofs for washing purposes, in water butts or tanks. It will be seen on the drawing that the water butt is raised to allow, to a certain height, for the overflow to enter and leave the bath automatically, thus keeping a storage for washing days; a trap being conveniently placed for cleaning out in case of stoppage. These wastes are fitted with wooden plugs to save plumber's work. Drinking water is better obtained from an Abyssinian tube well and pump, than dipped direct from an open well.

#### Sanitary Arrangements.

When the supply is abundant, w.c.'s might be introduced, otherwise, earth closets should be placed in out-buildings having space for a good supply of dry earth.

It is, I think, by some such arrangement as the foregoing, that we must endeavour to save expensive materials and skilled labour in building cheaper houses. The walls should be solid and strong, and all other work substantial and not likely to cost much for repairs and up-keep.

Other ideas will doubtless occur, and I trust the matter may be fully discussed, and some practical conclusions arrived at to endeavour to keep more men on the land and prevent, to some extent, the overcrowding in towns.

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### STEAM ROLLING OF IRISH ROADS

In a recent letter, Mr. R. J. Mcreedy writes *apropos* of the unanimous refusal of the Longford County Council to adopt steam rolling, on the ground that it would deprive the present road contractors of a source of income. He quotes Mr. Hackett, the Co. Surveyor of South Tipperary, to the effect that steam rolling reduces the cost of the maintenance of the roads by fully 50 per cent., and goes on to say "that if this is true, the ratepayers have been for years making contractors and labourers a present of half the amount annually spent on the roads, and in return they get inefficient highways, which cause an immense amount of wear and tear on horses and vehicles, and reduce the haulage powers of a horse by at least one-third, as compared with steam rolled roads. Even granting that the statement that the labourers and contractors would be at the loss of the total amount now realised was correct, does such a state of affairs warrant the ratepayers' representatives paying 50 per cent. more to get work badly done which might be efficiently performed by steam rolling?"

"I do not admit, however," says Mr. Mcreedy, "that the statement as to the loss to the present workers, if steam rolling were adopted, is correct. Many labourers are employed on steam rolling, and when the surface has been finally rolled it is essential to have millesmen at work all the year round cleaning the road surface and keeping the water tables clear, while a certain amount of patching becomes necessary after some years. This affords regular employment all the year round. It therefore follows that the ratepayers are paying much more than they might otherwise do, and having their vehicles racked to pieces lest, forsooth, a small proportion of the profits earned by the present road workers should not find its way into their pockets."

With reference to road contractors being paid 50 per cent. more for doing work badly than it could be well done for by a steam roller, the road contractors invariably complain that their prices are too low—and so they usually are—yet they dread losing their contracts. The explanation is simple. The work contracted for is not half done. We know of one county where, some years ago, it was perfectly notorious that the same heaps of stones were spread out for admeasurement by the Surveyor in half a dozen different places, being removed quickly as soon as measured and certified for, the fortunate contractors, or rather the chief contractors, waxed fat and exceeding rich.

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Mr. H. Hems, the well-known ecclesiastical sculptor, of Exeter, says:—"My best wishes for the continued prosperity of your most excellent journal."



## FERRO-CONCRETE BRIDGE CONSTRUCTION.

So much attention has of late been directed to all forms of ferro-concrete, armoured or reinforced concrete construction—to give the method and system some of the several names accorded to it—that we are pleased to be able, through the courtesy of the Yorkshire Hennebique Patent Ferro-concrete Company, to put before our readers four reproductions of photos illustrating the construction of two bridges over the river Roch, at Rochdale, which were last year completed by the company under the supervision of the borough engineer of Rochdale, Mr. S. S. Platt, M.I.C.E. These bridges were the first in England to be constructed entirely of ferro-concrete from the foundation to the superstructure.

The abutments are supported on ferro-concrete piles driven into very hard ground. This arrangement was rendered necessary by the fact that old flooded colliery workings underlay the site, and Mr. Platt did not consider it safe to trust to such ground. The piles were of 14 in. square section and of varied lengths, up to 60 ft. Holes of 14 in. diameter were bored to enable them to be driven to the floor of the old galleries.

The first illustration shows the distribution of the steel bars in the abutments and the method of connecting a superstructure to ferro-concrete piles. The next photograph shows one of the abutments nearing completion. The third photo shows the construction of the flooring.

The bridges were very carefully and severely tested, the following being the method adopted:—The heaviest load likely to pass over the bridges was a Lancashire boiler weighing, say, 20 tons. The footpath on each side was loaded with 25 tons of pig iron, or 50 tons in all. Standing just beyond the bridge was the Corporation steam roller, weighing 10 tons; a bogey weighing 8 tons, loaded with 24 tons of pig iron; and a smaller bogey weighted with pig iron to 18 tons. Not only were these weights enormously greater than there was any probability the bridge would ever be called upon to bear, but as the wheel base of the bogeys was only 8 ft. 6 in. by 6 ft. 0 in. it was more compact, and so put a proportionately greater strain upon the structure than the long Lancashire boiler, which is regarded as the heaviest load likely to be borne in actual practice.

The test was in every sense most satisfactory in its results. The bridge having been loaded as above described, a further test with a live load was applied. First the steam roller was driven over the bridge. On a platform below was a company of engineers and others eagerly awaiting results. Suspended from plaster of Paris moulds under the arch were several steel rods with spring balances attached and dials to record the deflection so amplified as to make it visible to the eye. The fifty tons of pig iron on the side paths remained there throughout the test; the two lorry loads, together another fifty tons, were drawn backward and forward, first over the centre of the bridge and then on one side, where there was least reinforcement of steel in the concrete and where, therefore, the resisting power was least. The maximum deflection was only about 1-25th part of an inch, although  $\frac{3}{8}$  of an inch was expected.

Our last illustration shows the completed bridge. The width of the roadway is 47 feet, and the span 23.6 feet, while the load applied as a test equalled 140 lbs. per square inch, or 32 tons moving load on four wheels.

The span of the bridge is, of course, inconsiderable, but the readiness with which ferro-concrete may be utilised as a solution of the difficulty of dealing with bad foundations lends an importance to this innovation in bridge construction that it would not otherwise possess; while the principle involved is equally applicable either to work done on the piling system or in other classes of structures, such as tanks, to the formation of concrete rafts floated on soft semi-liquid "slurry." It is obvious that a ferro-concrete form of bridge on bad foundations must possess qualities of reliability, combined with cheapness, that no ordinary masonry methods can possibly have; while from the æsthetic point of view, although the ferro-concrete system is far behind the noblest bridge structures in masonry of the olden time, it is, at all events, infinitely superior to many of the hideous engineering structures of the "sixties" and "seventies." True, such a colossal work as the exposed construction of the Forth Bridge has a nobility, dignity, and beauty that is absolutely its own, a fact that even John Ruskin himself admitted and declared; but still the average iron roof or bridge is undeniably ugly; almost without a redeeming feature. The small example of bridge construction, which we illustrate, is of broad and simple character,

free from pretension, and if not of striking artistic merit, is, at all events, very inoffensive to the eye; a marked contrast to such structures as the notorious Charing Cross Station roof that fell the other day, and there can be no doubt that in the hands of a capable man of artistic feeling, such structures, treated in a broad and plastic fashion, avoiding the crude imitations of carved or constructional stone that so many of our ablest engineers in the past loved to clothe their structures in: hopeless shams of cast iron, deceiving no one, and only rendering these designs objects of the derision of the artist, might yield artistic as well as practical results that would surprise most people. Reverting to the practical: the failure of the Charing Cross roof has again directed attention to the eminently serious question of the deterioration in the factor of safety of purely iron, and even steel, construction, when exposed to every influence of our ever changing climatic conditions. In the Charing Cross roof, as in all the engineering work of that date, the factor of safety was more than abundant—not to say prodigal. Yet that roof failed; notwithstanding that the tie rod was the thickness of an ordinary railway carriage axle it snapped. The only possible explanation is deterioration in some form or another. Now ferro-concrete construction appears to get rid of much of this element of uncertainty; the life of the Charing Cross roof was far too short, from an economical and commercial point of view, to be satisfactory in any sense. Ferro-concrete construction—using the term in the broadest sense—has been too short a time under expert observation to enable anyone to absolutely dogmatise upon its span of life, but it has been sufficiently well known to us, to enable us to form the opinion that steel encased in concrete has a long measure of life in it, while the bogey of the unequal expansion and contraction of the two materials has been set at rest by recent observation in America and elsewhere, it being proved to be a practically negligible quantity; and steel has been cut out of concrete, after the lapse of several years, passed under varying conditions, with all its properties of strength practically unimpaired. The subject is an extremely interesting one to architects and engineers alike. Unfortunately the trend of training of the two branches of the allied professions runs in opposite directions, architects too often being inclined to sacrifice too much to appearance, which admirable as that sentiment may be, often leads to the ignoring of severely practical considerations, and loss by the avoidance of many modern forms of construction. While engineers, on the other hand, sometimes ignore the æsthetic aspect or foolishly endeavour to conciliate public opinion by embodying false forms in their construction, which only results in contemptible work: this new form of construction appears to afford a basis upon which both engineers and architects might profitably work, so common are the possibilities of this form of construction, and possibly evolve something that would be at once scientifically economical and artistic. This aspect was thoroughly recognised by that skilful architect and delightful writer, Violet-le-Duc, many years ago, and he even tried to work out designs embodying the principle, but being possessed, naturally, of only the scant knowledge of thirty or forty years ago, and ignorant of the possibilities of concrete-steel construction, or beton armée, as the French call it, his designs being based merely upon the applicability of cast and wrought iron, as applied to large building structures, were hideously ugly; still a perusal of the later chapters contained in his great work, "Lectures on Architecture," might suggest to engineers and architects something of the lines upon which to proceed.

In a letter to the *Times*, Mr. T. G. Jackson R.A., drew attention to the fact that it is sometimes alleged that Portland cement does not afford a reliable protection against the corrosion of iron and steel. It is a pity Mr. Jackson should as one of the heads of his profession, spread such views, which, however, are common enough, but coming from one of his position are calculated to impress those not familiar with the subject. The fact is that there is the most reliable evidence showing that concrete does protect steel. Moreover, iron and steel rust rapidly only when exposed to the atmosphere, and the fact remains that Portland cement is one of the most effective agents for the protection of steel or iron from the action either of weather or fire.

Some important facts respecting the use of steel for reinforcing concrete were communicated by Professor Warren to the Royal Society of New South Wales at the meeting of September 6. Some prepared bars of Bessemer steel were pulled out of concrete prisms 4 in. by 4 in. and 12 in. long by means of a testing machine. Three sets of experiments were conducted, and with steel bars having the natural skin on after 45 days hardening in air the adhesion was 108 lbs. per square inch. With the skin and the steel polished the adhesion, after the same number of days in air, was only 125 lbs., but in water after the same length of time the adhesion was 185 lbs. per square inch, the steel bars being polished.

## THE HOUSING OF IRISH RURAL LABOURERS.

By R. M. BUTLER.

The housing of the rural labourer is a question of national importance, for it is an elementary fact that a prosperous, healthy, and contented peasantry is the backbone of a nation; from this class is drawn the best material for the manning of armies and navies and great industrial enterprises. From the rural districts, too, the town population must be periodically reinforced, for it is well established that three or four generations of town breeding under the conditions that prevail, and must continue to prevail in crowded manufacturing centres, inevitably leads to physical deterioration if new blood be not regularly introduced. In England many rural districts are from various causes practically depopulated. The British army too is now mainly recruited in crowded cities, and consequently the physique of the men has deteriorated very seriously. England is to-day within measurable distance of the time when she will be without a peasantry to draw upon, unless measures be taken to stem the tide that is continually flowing from the agricultural districts. The towns have moreover become so filled with a labouring population exceeding the demand for labour, thus producing the ever present problem of the unemployed; a substantial proportion of whom are, in fact, through physical and moral deterioration, incapable of useful employment. In England and Scotland the rural labourer when discontented with his lot migrates into the towns. With us there are no great industrial centres where they may have fair chances of employment, so the best and most enterprising Irish rural labourers emigrate, and the country loses the very cream of its rural population.

**English Bye-Laws.**

The English Rural Bye-Laws are often absurdly stringent, but even their total abolition will not supply an answer to this great problem of housing.

**The Problem in Ireland**

In Ireland the problem has been met and to a great extent solved, in the only fashion in which it is possible to attain practical, widespread, and substantial results, namely, by means of a local rate and State aid. Acts of Parliament have been passed to give effect to this. The first became law in 1883 and is known as the Labourers (Ireland) Act. It established a revolutionary and almost socialistic principle, including the compulsory acquisition of land. At that time throughout Ireland the housing of the rural labourer was simply deplorable, as indeed it still remains in many districts where the Act has not been adopted. The Act of 1883, and subsequent amending Acts, empower the local sanitary authorities to 'acquire land, either by agreement or compulsorily, and thereon to build cottages for labouring men allotting to each a plot not exceeding one statute acre.

**Procedure Under the Act.**

The procedure is briefly as follows:—A labourer desirous of obtaining the benefits of the Act must fill up a "Representation Form," setting forth certain particulars, and this application must be based upon one of the following grounds: that the dwelling he occupies is unfit for human habitation, and the certificate of the Medical Officer of Health must be produced; or that there is in the district insufficient accommodation for rural labourers: this latter cause may apply either to a man coming from another district and obtaining work, or to men living in lodgings or in houses of which they are not the tenants. The representation must be endorsed by the statutory number of assenting ratepayers (six). Upon being presented to the District Council that body may, if they think proper, approve it, and proceed to "make a scheme," as it is called. The labourer in his application must suggest a site, which the Council may adopt or substitute another for as they think fit. The selected sites are marked upon Ordnance Maps; plan, specification, and estimate of cost are prepared, and a petition to the Local Government Board is drawn up, praying for the holding of an inquiry and sanction to a Treasury loan to cover the outlay, repayable out of the rates, and spread over a period of 35 to 50 years, with interest now fixed at  $3\frac{3}{4}$  per cent. per annum for 30 years, 4 per cent. for 40 years,  $4\frac{1}{2}$  per cent. for 50 years, which constitutes a sinking fund repaying principal and interest. The Local Government Board in due course depute one of their Inspectors to hold a public inquiry, at which evidence is taken as to the necessity of the scheme, the eligibility of the applicants (who must be labourers in receipt of not more than 15s. per week average income). The objections of ratepayers or of persons whose land it is proposed to acquire

by compulsion are also heard; and then, if the Local Government Board on consideration of their Inspector's report are satisfied, a Provisional Order is issued authorising the Council to enter upon and take possession of the lands, and the Treasury is recommended to grant, through the Board of Works, the necessary loan to defray all charges for building, law, engineering, and the cost of the land. The value of the lands is fixed by a Government arbitrator. No local contribution is required. Owners of lands have the right to appeal to the Privy Council against the Provisional Order, but there is no appeal against the arbitrator's award. If no appeals are entered, the order becomes absolute, after compliance with certain other formalities.

This is only a brief outline, but many other formalities, some bordering on "red tapeism," have to be gone through, but it is unnecessary to here further consider them.

**The Charge Upon the Rates.**

The cottages which have been built under the foregoing conditions have put but a small charge upon the rates, so small in a rich Union as to be negligible, while the "Exchequer Grant" substantially helps the projects towards becoming practically self-supporting. In some Unions the various schemes have not cost the ratepayers one half-penny.

The total loans sanctioned from 1883 to the close of the financial year ending March, 1905, were £3,288,829 4s. 2d.; 23,340 cottages were sanctioned during the same period, and of these about 20,000 were actually built.

Taking the South Dublin Union first. The valuation of the entire district is £80,645. They have built 214 cottages, and the charge upon the rates amounts to  $1\frac{3}{4}$ d. in the pound. One penny in the £ produces £336.

The Rathdown District has a valuation of £72,466, and the total number of cottages built in the No. 1 District is 72, and in the No. 2, built or being built, 14, or 86 in all, while a Provisional Order has been issued authorising 66 more. Four loans have been advanced, at  $3\frac{3}{4}$  and  $3\frac{1}{2}$  per cent. interest. The charge upon the rates in respect of labourers' dwellings amounts, so far, to only .23d. in the £. The "Exchequer contribution," which is a variable sum proportionate to the expenditure of each Council, in 1904 relieved the rates in the No. 1 District alone to the extent of £120 3s. 2d., and in 1905, £97 6s. 3d. The area of charge, of course, only extends over the rural districts and not over the urban districts within the Union, and id. in the £ produces £366 2s. 2d.

The Omagh Union has been exceptionally fortunate in securing a substantial share of the Exchequer contribution, with the consequence, as already mentioned, that the charge upon the rates is nil—a most satisfactory result.

They have built 133 cottages, the valuation is £107,500, and id. in the £ produces £447 18s. 4d.

The average cost of cottages built under the Act may be roughly taken at £200 to £250 for all Ireland, which includes land and incidentals. In districts like Rathdown or South Dublin, of course, the cost of building is substantially higher than in the country, and the buildings alone sometimes cost as much as £185 each.

**Cottages Built in the South.**

The accessibility of the site has, however, a great deal to do with the contract price, because near to a railway station the same cottages have been built in groups for £140 each. Some of the large Unions in the South have built cottages to a great extent. For instance, Cork with 560 cottages; Dunmanway, 363 cottages; Fermoy, 413 cottages; Macroom, 556 cottages; Limerick (1 and 2), 725 cottages; Kilmallock, 760 cottages; Wexford, 565 cottages; Mullingar, 428 cottages; Enniscorthy, 565 cottages; and so on.

Of the total for all Ireland, Munster has built practically 12,000, or more than half.

The highest charge upon the rates that can occur is 1s. in the £, which is the statutory limit.

**Rents.**

The rents charged for these cottages and plots of land varies from  $6\frac{1}{2}$ d. in Macroom to 2s. 6d. in Rathdown, though many of their cottages are let at lesser rents. As a rule the rents are punctually paid, and the amount of arrears in most unions is small, varying from nil to about £30. A few of the larger unions in the South have, however, a substantial sum of rents in arrears; Macroom tenants owe no less than £244.

As regards the public value of the Act and the principle of State aid in the shape of Exchequer contributions and loans perfectly secured on the rates, there is no room for difference of opinion. The average rural labourer, either



in England or in Ireland, seldom earns more than 14s. or 15s. per week all the year round, and he is a very lucky man who has 15s. secured.

#### The Cost of Cottages.

To build a cottage decent, roomy, and commodious, and of so permanent and substantial a character as to need little or no repairs for several years, is simply impossible for less than £130 to £140, but more generally £150. But it is equally the fact that for from £140 to £160 per house can be built a very decent cottage in the most substantial fashion without having recourse to the bad expedient of temporary or semi-temporary materials. A good brick or masonry cottage can, and is being built, all over Ireland for £150 or less, and this, notwithstanding that building is at least as dear as in England. Of course the average Irish plan is capable of much improvement; generally it consists of a structure about 16 by 24 inside dimensions, divided into a kitchen 12 by 16 and two bedrooms each 12 by 8. Other plans provide a kitchen 16 by 12 and a single large bedroom on the ground floor of the same size, with one or two attic bedrooms, each about 12 by 16. In my opinion the two-storey cottage is the best and cheapest type, though least popular. No cottage should contain less than three bedrooms, one of which should be of good size, and two of which, at least, should have fireplaces, more for the sake of ventilation than for heating.

#### Materials.

Wherever masonry is cheap it is the best material to use, but 14-in. brick or 10-in. good concrete are also excellent. The use of 9-in. brick walls or thinner concrete is bad. The ideal is a 20-in. masonry wall pebble dashed in cement. A Sanitary Authority is not like a private owner, who can look after his property constantly. District Councils have to rely on their rent collectors.

Any defects arising in cottages belonging to a public body can only be dealt with at excessive cost. Flimsy materials are, under such circumstances, an abomination. To build solidly and permanently, nothing can replace good, solid, thick masonry, brickwork or concrete; timber and patent materials are out of the question.

The external appearance should be severely plain, and one must trust to a good outline for effect. Casements look nice, but are unsuitable in this country. It is nearly impossible to get them to keep out our driving rains. Cement dashing is the only thing that will keep wet from getting through the walls in exposed situations. Projecting porches, unnecessary gables, and ornament add to the cost. Good ornament is very dear, and bad or commonplace ornament only an eyesore. In two storey cottages a little string course at the ceiling level improves the proportions by making the cottage look lower, and costs little.

One storey cottages built of 9-in. brickwork are in our climate a failure, and a nuisance to all concerned—builder, tenant, architect and Council. A good cottage can be built for about £150 or less, and there is no real need in most districts for a very much cheaper one. Joinery should be cheap and strong. White St. John's deal and white Norway flooring is quite good enough, except for external work. Roofs should be covered with strong heavy slates; no ordinary cheap, thin Bangor or American slates should be used. There is nothing better than our native Irish slates if used thick and small enough—say not more than 16 inches by 10 inches. Great attention should be paid to slating. Tiles are not so reliable.

The most economical plan of cottage is two rooms over two, or two over three; never three over two.

Concrete floors are unsatisfactory, because with bad contractors and a number of houses going on at the same time it is simply impossible to watch them. They ravel under hob-nailed boots and rough chuse, and cannot be repaired. Nine-inch by 9-inch Chester tiles on 3-inch of rough concrete are nearly as cheap and much better. Everything should be strong and cheap. Hearths should be of firebrick on edge set in cement. A stone set in the floor should be provided for chopping sticks on.

#### Site.

Cottages should be built on a dry and elevated site, near to a supply of good drinking water from a stream or well, and all roof water should be collected into a big well painted barrel, which is better than a galvanised tank. Drainage should not be provided, unless you have an exceptionally good outfall to a dyke. It only ends by becoming a nuisance. The open fields are, in the country, the best receptacle for household slops. Plastering is best of two-coat work twice lime whitened, and this also should be watched with great care, and contractors compelled to run the putty at a very early stage. The ground plan should not be frittered away in pantries and offices. The practice adopted in England of frittering away the ground floor in sculleries, and so forth, is waste-

ful. All the space within the walls should be devoted to kitchen and bedrooms. What the labouring man wants is *living accommodation*, pure and simple.

#### Fencing.

The cheapest and most durable fence is undoubtedly a good sod fence, consisting of bank and dyke, with quicks planted. It can be done for from about 5s. per lineal perch, or less, whereas iron fencing, which needs painting every three years or so, costs about 3s. to 3s. 6d. per lineal yard, or £3 6s. per Irish perch.

#### Whitewashing.

Whitewashing with lime mixed with tallow gives a nice clean appearance, and protects the walls from the driving rain.

#### Self-Detached Cottages.

Labourers' cottages are best built in pairs. It reduces the cost substantially, and decreases the number of outside walls. Back doors are a nuisance, and only result in making the houses cold and draughty. The position of doors should be studied so as to avoid draughts. The best place for the stairs (if there be an upper storey) is in the kitchen, and it should not be too steep on account of children. The height of the rooms is an important point. Eight feet clear from floor to ceiling on the ground floor is abundant, and there is no objection to omitting the plaster ceiling in the kitchen, where there is an upper storey, and whitewashing the joists. In single storey cottages it is a great mistake to make the roof open to the ridge, or the ceiling too high; it makes the house intolerably cold. The upper floor rooms should be full 4 feet to the wall plate with a good-sized dormer, and even in the dormer up-and-down sashes are preferable, casements have caused great trouble. There should be three bedrooms in all cases, and in no instance ought one to open out of the other. One or two small cupboards, and a few feet of shelving, are most useful.

This great work of the last twenty-three years, the housing of the Irish rural labourer, has been little talked about; but it is one that Ireland has reason to be very proud of. While rural England is being rapidly depopulated, we, in Ireland, have accomplished so much, and it has done more than anything else to combat the awful drain of emigration.

Since the passing of the Act there have been authorised close on 27,000 labourers' cottages, each with its little plot of land, and capable of accommodating in modest comfort, an average of not less than five persons per house, or say, 121,000 to 125,000 souls, a small number in comparison with the total population of a nation, but large when we consider the objects achieved and the difficulties that lay in the way.

### MASTER BUILDERS' ASSOCIATION

At the annual general meeting of the Master Builders' Association, held at the Grosvenor Hotel, Dublin, on the 11th inst., the following officers were elected for 1906:—President, James Beckett. Vice-President, Richard Denne Bolton. Committee—Thomas Conolly, J. E. Foley, James Kiernan, Thomas Mackey, H. McLaughlin, Henry Pemberton, B. W. Whyte, and E. W. Warren. Honorary Treasurer, S. Roberts. Honorary Secretary, John Good, 55 Great Brunswick-street, Dublin. Mr. John Good was re-elected representative on the Board of Technical Education for the City of Dublin.

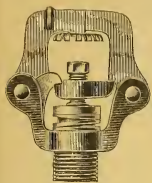
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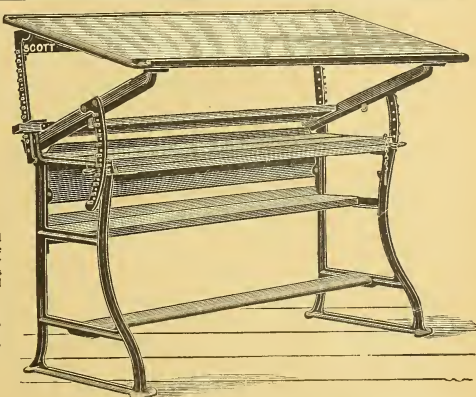
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## APPOINTMENTS UNDER LOCAL AUTHORITIES.

The other day an advertisement by a District Council for a clerk of works came under our notice, and it throws such a light upon the working of many of the Councils throughout rural Ireland that we reproduce it for the benefit of our readers. It emanates from the Midleton Rural District Council. With rare circumspection the Council styles this officer "Clerk of Works," and not "engineer" or "architect," but that that is a distinction without a difference is apparent from the fact that the person appointed will be required to "prepare specifications," and though no mention is made of drawings, it may be taken that they will form a necessary adjunct to the specifications.

The advertisement reads as follows:—

THE RURAL COUNCIL will, at their Meeting on SATURDAY, the 13th JANUARY, 1906, appoint a Competent Man as Clerk of Works, at a salary of One Pound per week (which is to include preparation of Specifications, Travelling, and all other expenses). The person appointed must devote his whole time to the business of the Council, and carry out any orders he may receive. The Council reserve to themselves the right to determine the employment at any time on giving one month's notice.

What the result of the sharp competition that doubtless ensued was, we know not, but that whoever was appointed will speedily be transformed into an "architect and C.E." we doubt not. The rate of remuneration is,

of course, utterly absurd; it is much below the ordinary scale of tradesmen's wages, even in the country, and, of course, *must* be supplemented from some source or another; and as the person appointed "must devote his whole time to the business of the Council" it is difficult to see how he can supplement his income by honest means, particularly as he has to pay his own travelling expenses out of his wretched stipend. That the office is no sinecure is apparent when we mention that the Midleton R.D.C. are the owners of over 300 labourers' cottages actually built, and that in addition 35 are, or were some little time ago, in course of construction, and are probably scattered over an enormous area.

We notice this incident because the same or a similar state of things exists in many many districts throughout the country, particularly in connection with schemes under the Labourers Acts, which, as is shown in another article in this issue, have occasioned a great amount of work during the past quarter of a century, and were only qualified architects employed at a suitable remuneration, this work would have afforded in the past, and would continue to afford in the future, a considerable number of young architects a very suitable field for employment, with advantage to the ratepayers and the occupants alike. But what are the facts: and we can imagine no stronger argument for "Statutory Enrolment" or Registration, than the state of affairs in this particular, for but a small minority of the Councils, we think we are safe in saying, retain as architects men with any semblance of qualification. Some of the men engaged in this responsible work, involving such large outlay and such great moral responsibility, are utterly unfitted for their positions. Some have never superintended the putting of one stone upon another. Some are men who have done a little bit of speculative building on their own account, some are tradesmen who never made, and occasionally can hardly read a plan, others are County Surveyors' assistants in remote districts, whose principal previous technical experience has been in connection with road mending. These are the worst cases. The Local Government Board declare they have no power to stop this system of the miraculous creation of architects and engineers. Usually the appointments are tendered for, and invariably gained by personal influence, the successful competitor being by a stroke of the chairman's pen invested with the magic degree of "architect and civil engineer to the Ballymuck Rural District Council," and then he blossoms forth into private practice. The result is often ill-designed and carelessly or incompetently superintended work, and in addition qualified architects are robbed of legitimate sources of livelihood.

The same or a worse state of things prevails in many districts as regards the contractors. Men of the most incompetent type are readily employed so long as they have sureties and tender at a low figure. In the more remote districts it is sometimes impossible to attract a respectable class of contractor, and the work falls to men who have never before built a house, seen a plan, or have the remotest idea of the value of work, or how to set-out or construct it, their estimating being evolved by a process of combined intuition and sportsmanlike pluck. They know a similar cottage was built in such and such a place, and tender at a few pounds more or less. Occasionally these men are thoroughly dishonest—unscrupulous to the last degree, and a book might be written of the laughable blunders, the extreme and low cunning that some of them display. They are on occasion employed because none others can be obtained, sometimes after other tenders have been on three or four



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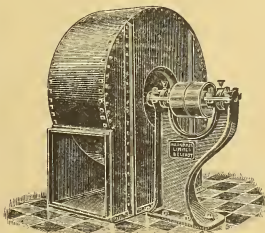
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successive occasions considered and rejected as "too high." To meet with a couple of really bad contractors on a large scheme is enough to turn any architect's hair grey, for no amount of supervision can produce good work from such men. They are neither able nor willing to do their work honestly or decently. So much for the seamy side. On the other hand there are throughout Ireland many honourable and skilful contractors engaged in building and drainage work for Rural Councils, but they are most usually found in close proximity to large towns.

Now as to a remedy. As regards the architects: "Registration" in some form or other is the only real solution, but the L.G.B. ought to be empowered by law to refuse to consider any scheme not signed by an architect of at least some experience. We do not suggest that every man should be a Norman Shaw or even a member of the Institute, but *some* standard should be set up. Millions of public money is involved, and we feel convinced that a firm remonstrance, or even friendly advice, if it went no further, from the L.G.B. as to the necessity of employing competent men, would in most cases be productive of good—at all events it could do little harm.

As to bad contractors, we can only suggest, as a remedy, the more frequent grouping of cottages. This would tend to economy, and, at the same time, attract better contractors, while men notoriously guilty of fraudulent practices in their contracts, should be "starred" and excluded from ever again tendering for work under a District Council, a list of such men being supplied to the L.G.B. for the use of their auditors.

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## COMMENTS.

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### Architects and the Timber Trade.

It is to be presumed that everybody who ever saw an advertisement hoarding is aware that there has been recently issued a serial publication entitled "The Harmsworth Self-Educator." The eight volumes of which it will be composed are advertised as forming an exhaustive boon of general knowledge and technical instruction, constituting a "golden key to success in life." Probably some of our readers have invested in the parts that have already appeared, and if so they will have noticed in Part I. an article on the "Characteristics and Properties of Timbers." With the general tenor of this article we have no fault to find. It gives a good account, with ample illustrations, of the general characteristics, growth, and defects of wood, and a description of the principal features of the best known hard and soft woods. There is one portion of the article, however, which is, to say the least, most misleading, namely, the paragraphs in which the author differentiates between the qualities and characteristics of red and white deals from the various ports of shipment. The information (so-called) conveyed in this portion of the article might have been accurate twenty-five years ago, but it certainly does not represent the existing facts with regard to the timber trade. The statements about red deals clearly take no account of the changes that have taken place in the exporting areas during the last generation, and the value of the remarks on white deal may be estimated from the fact that it is calmly stated that Canadian spruce is not much used in these countries. We do not suppose that builders will go to the book in question for their information, but the significant thing about the article is that it was written by a gentleman who is actually examiner for the Society of Architects.

Now, it is perfectly clear that any architect trained for an examination on the lines we have just indicated would be hopelessly out of touch with modern practice and modern facts in the timber trade, and that specifications drawn up by him would be antiquated. This is a feature

of the case to which we have more than once directed attention in these columns, as, for example, in our series of articles on "Timber as a Building Material." We there pointed out that a great many architects' specification with regard to timber make demands upon the builder which are absolutely impossible for him to meet. Within the past quarter of a century timber importing in these countries has undergone a radical change. In the old days shipments consisted principally of log timber, which was converted into deals, boards, and scantlings on this side. In this converting of the woods it was possible to a large extent to avoid defects. The sapwood could be cut away, knotty portions rejected, and the difficulties of shakes eliminated by skilful cutting. Nowadays the log trade has dwindled to comparatively insignificant proportions. The erection of enormous saw mills at the ports of shipment has resulted in the conversion being done abroad, and the vast bulk of the timber now comes in sawn to deal, batten, scantling, and board sizes. In addition to this, the quality of the timber is distinctly inferior, particularly in red wood. The trees are cut younger, and consequently contain a larger proportion of sapwood, and some of the areas from which the more prized varieties were derived have been cut out (Memel timber, properly so-called, has, for example, ceased to exist). The original classifications have been altered—where firsts, seconds, and thirds were formerly shipped, mixed and thirds only are now obtainable. We might continue this list of the changes that have taken place to a column of our space, but we have said enough to show that specifications based on the days of Crown Memel, Christiania Red Deals, etc., and declaring that the timber must be "free from shakes, knots, sap, and other defects" are out of date, and that they often lead to endless friction between architect, builder, and timber merchant.

We are aware, of course, that it is only an unreasonable or ignorant architect or clerk of works who will strictly enforce such clauses. But nevertheless the fact remains that the builder is absolutely dependent on the architect's discretion, or rather that he is at his mercy. Moreover, it is distinctly wrong that a builder should be asked to solemnly sign an impossible contract. We do not for one moment suggest that good timber is now unobtainable, or that architects should allow inferior material to be used. What we do contend and have contended is that specifications should be drawn up in accordance with facts in the timber trade as they actually exist, and not on the basis of obsolete traditions. The matter is one for arrangement between builders and architects, and we think the time has come for the holding of a representative conference, to which possibly some of the leading timber merchants might be invited.

### Irish Slates

At a recent meeting of the Council of the Irish Industrial Development Association, the question of the use of Westmoreland slates in preference to Irish at the new Training College, Glasnevin, was again before the meeting. It was stated by the secretary that the late Chief Secretary for Ireland, Mr. Walter Long, promised to allow Irish slates to be tendered for, and that they were actually tendered for at nearly £400 less than English slates, but Mr. Long ultimately refused to accept them, merely for the sake of artistic effect. The question had been brought under the notice of Mr. James Bryce, the new Chief Secretary for Ireland, for the purpose of intervening and saving the unnecessary expenditure of £400 of Irish money. Mr. Bryce wrote stating that the published correspondence with his predecessor (Mr. Long) gives a full explanation of the circumstances in which English slates were specified. It appears that the contract was definitely entered into some time ago, and in these circumstances he (Mr. Bryce) is unable to intervene in the matter.

The Council agreed to direct the attention of the Chief Secretary to the fact that his predecessor gave the assurance to Mr. Field in the House of Commons that Irish materials would be used where possible.

We have already fully dealt with this matter, so that it

is needless to recapitulate that which has passed. Mr. Bryce seems to us, however, to base his refusal on somewhat wrong grounds when he says he is "unable" to interfere. Most building contracts, and we assume this one is no exception to the rule, contain a proviso reserving to the architect the power to omit, alter, amend, or increase any item of the work, and that the value of such change shall be ascertained by the architect and added to deducted from the contract price as the case may be.

### NEW IRISH ENTERPRISE.

In the recent interesting address given at the Trinity College, Dublin, by P. C. Cowan, M.I.C.E., Chief Engineering Inspector of the Local Government Board of Ireland, on the construction and maintenance of roads, Mr. Cowan stated that the ideal pavement for town use should be smooth to the wheel, rough to the hoof, almost noiseless, and impervious, so that it may not absorb impurities, and, when drying, give off offensive emanations. The pavement of the future, in his opinion, was an asphaltic pavement, containing a sufficient amount of grit or sharp sand to remove the difficulty often felt as to foothold for horses, which difficulty can easily be dealt with by ample cleansing with water.

Such a paving as above recommended is happily within the reach of all City and Borough Councils. The Limmer Asphaltic Paving Co., Ltd., of 2 Moorgate-street, London, which has been established since 1871, and has carried out some of the most important asphaltic work in the United Kingdom and the Continent, has just completed one of the most important and up-date factories, principally with a view to manufacture their well-known brand of Limmer mineral rock asphalt and their Patent Lithofalt mineral paving, at Magheramorne, Larne Lough. These works have been constructed or the most improved principles and fully equipped with expensive and modern machinery.

It is intended that these new works at Magheramorne should be the headquarters for Ireland, Scotland, and the Mersey Ports, and enable the company to manufacture their material on the spot, instead of in London as formerly.

The company will, therefore, in future ship direct from their mines abroad to Magheramorne, which will naturally lead to a large employment of local labour, which is much needed, and the management of such an undertaking should receive from the City and Borough Councils every possible encouragement.

This new paving, Lithofalt, is a happy medium between the mineral rock compressed asphalt and the tar macadam or tar paving. The former, except for first class and heavy traffic in cities, is oftentimes considered too expensive; but Lithofalt is the very ideal pavement as mentioned above, and is suitable for streets of light traffic, court-yards, passages, footways, floors, play-grounds, etc. Lithofalt can be laid down in a semi-liquid compressed powdered state, and rammed down and rolled whilst hot, or in a more liquid mastic state *in situ*. Lithofalt is an excellent sanitary paving, and is particularly suitable for large cities and provincial towns, where narrow streets, courts, and alleys are practically the playgrounds of the children.

Lithofalt has great advantages over ordinary macadam, tar macadam, road paving, and the noisy stone sets. It is impervious to moisture, easily and quickly laid or repaired, thus causing no inconvenience to traffic. It is comparatively noiseless and admits of great ease of traction, there being a minimum of vibration. It prevents the accumulation of dirt and dust, and its value is greatly enhanced by its durability, elasticity, and its ability to withstand the extremes of heat and cold; being non-absorbent, it can be easily flushed with water and so kept perfectly clean.

Lithofalt has been successfully laid for the City of Belfast, also for the warehouse floors of the North of Ireland Paper Mills, Ballyclare; the East Lancashire Paper Manufacturing Co., near Manchester; the Borough Councils of Poplar, Lambeth, Camberwell, Shoreditch, Paddington and Hampstead, and the new flooring to Messrs. Vickers, Son and Maxim's works at Erith, and Messrs. Henley's Telegraph Works at Woolwich, etc.

To builders and contractors requiring Lithofalt for covering horizontal damp courses on walls, floors, play-grounds, etc., the company are prepared, where the amount of work to be done is insufficient to allow them sending their own men on account of expense, to supply the material and give them printed instructions as to its use.

Mr. F. A. Porter is the company's representative for Ireland, and his offices are at 13 Queen's-square, Belfast, where every information will be given.

The Cheshire Lines Committee are erecting additional platforms at their Manchester Central Station, the roofs for which are being glazed by Messrs. Helliwell and Co., Limited, of Brighouse, Yorkshire, and 11 Victoria-street, Westminster, London, with their patent "Perfection" system of glazing without putty.

### THE ELIMINATION OF STORM WATER AND SUSPENDED SOLIDS, AND STORM-WATER FROM SEWERAGE SYSTEMS.

At the ordinary meeting of the Institution of Civil Engineers on Tuesday, the 9th January, 1906, Sir Alexander Binnie, President, in the chair, two papers were read, namely, "The Elimination of Storm-Water from Sewerage Systems," by D. E. Lloyd-Davies, Assoc. M. Inst. C.E., and "The Elimination of Suspended Solids and Colloidal Matters from Sewage," by Lt.-Col. A. S. Jones, V.C., M. Inst. C.E., and W. O. Travis. The following are abstracts of the papers:—

The scope of the first paper was limited to a description of experiments and investigations into the subject of the discharge of storm-water from populous districts. A formula is framed for the estimation of storm-water discharge likely to obtain in underground channels from various defined areas, and this formula is proved by means of tables and diagrams compiled from experiments in the sewers of Birmingham, extending over twelve months, together with figures obtained from various other sources. An endeavour was also being made to prove the accuracy of the various instruments used for the experiments and the validity of the calculations adopted. The paper concluded with a description of a new type of storm-water overflow-chamber constructed in 1904 in Birmingham. The importance of constructing bell-mouths on outlets from man-holes in surface-water culverts, and of making the connection above the highest flood-water level when the velocity in the main exceeds that of the affluent, was emphasised.

In the second paper attention was drawn to the fact that the solids in suspension in sewage, and the sludge resulting therefrom, have monopolised general attention, to the entire exclusion of the colloids and the sludge to which they give rise. The presence of colloidal substances in sewage is established, and it is shown that, though variable in amount in different sewages, and in the same sewage at different times, they may be safely estimated as at least one-half of the organic constituents of settled, or filtered sewage. The importance to be attached thereto, however, is demonstrated to be not so much a question of quantity, as of behaviour in, and method of elimination from sewage. It was shown that ordinary tank operations, though they will cause the deposition of the suspended solids, and the formation of that sludge which has always been regarded as the crux of the sewage-disposal problem, will have practically no influence upon the colloids, which require to be brought into intimate or prolonged contact with material upon which they become particulate, forming a hitherto unrecognised and consequently disregarded sludge.

Observations and experiments were adduced to substantiate the contention that sewage is clarified by the physical operations—deposition of suspended solids, and abstraction of colloid and other substances as solid matters from solution and pseudo-solution—and that the bacterial influence is secondary and subservient thereto. So that whether sewage be discharged into the sea, or a river, or on to natural or artificial filtration-areas it is clarified in virtue of the elimination of solids, and not by reason of the biological character of the operation which has attended the liquid in its passage.

The secondary nature of the bacterial action is evidenced by the fact that the organisms are occupied in dealing with the solid matters which have been separated from the sewage, and which therefore are, in so far as the original liquid is concerned, out of consideration. Its subservency is illustrated by the existence of large accumulations which necessitate removal, proving that the ratio of deposition is in excess of bacterial resolution.

The accumulated solids were demonstrated to be much greater in amount than is commonly supposed; and to have, in all parts of the treatment-area, the characteristics of, in fact to be identical with, ordinary sludge.

These statements were substantiated by the results of nearly seven years' work in connection with the triple contact beds at Hampton-on-Thames. These triple contact beds were adduced as a striking object lesson, not only as regards the retention of organic solids, but also as an example of the protracted, if not inadequate character of the bacterial operation. In addition, they point to the necessity for the greater protection of artificial filtration-areas from the intrusion of depositable matters.

In land treatment this necessity was demonstrated to be not so manifest, and certain data being assumed, tanks, etc., which have had a long practical trial were described and illustrated.

On the other hand, where artificial processes are adopted, the more perfect elimination of suspended solids and colloidal matters becomes imperative, and means for ensuring such removal must be provided.

A means to this end was described, and illustrations of the hydrolytic tank system, with the results of 10 months' working was given.



## ANSWERS TO CORRESPONDENTS.

## Sanitary Institute Examinations.

"STUDENT" asks:—"Where can I get particulars of the Exams. to be held in Dublin next May by the Royal Sanitary Institute, as reported in your last issue; or perhaps you could give particulars yourself?"

[Apply to E. White-Wallis, Esq., Secretary, Royal Sanitary Institute, Margaret-street, London, W.

For the convenience of candidates a pamphlet is published containing particulars relating to the several examinations, copies of the examination papers set at previous examinations, and other information useful to students. This pamphlet can be obtained at the office of the Institute. Price 6d.]

## Bedding Slates in Mastic in exposed positions.

"A.D." Co. Mayo:—

[We think it would be a very good job to bed the slates in mastic to render them storm-proof, and to prevent a "blow up" in severe gales. The best way to bed the slates is to lay a fillet where the joints butt, from the nails up to the head only. This eases the exposed joints free, and is therefore better and cheaper than pointing; but of course is only applicable to new roofs, as it must be done at the same time as the slates are being laid. The probable extra cost over slating in the ordinary way would be nearly 7s. per square, roughly speaking.

With regard to your second query about replacing damaged slates. This should always be done with copper clips. Slates should never be nailed on the "weather." If the slate is only slightly cracked, it is better to let it remain in, and to slip up a piece of zinc under it.]

## Cement Skimming Coat to Concrete Floors.

"H.M."—[The skimming coat specified to floors is a bad job, and should never be done. The concrete should be floated off with the hand float, gradually working up the fine stuff to the surface. A steel instrument should never be used, and it should be so specified. The wood float brings up the cement by natural means, and produces a consolidated and uniform mass of equal strength. The skimming coat simply means a fine skin of cement, which in time cracks and breaks off, having no solid hold on the concrete below and being itself of but very slight thickness—usually not more than  $\frac{3}{8}$  inch to 1 inch thick. Besides this, it tempts bad contractors to do dishonest work, as a skimming coat covers a multitude of sins.]

## DUBLIN ARTISANS' DWELLINGS CO.

The annual report of the Dublin Artisans' Dwelling Co., Ltd., for the year ended 31st December, 1905, discloses a very satisfactory state of affairs. The customary dividend of 5 per cent. on the Company's stock is recommended, and the sum of £7,905 is carried to the Depreciation Fund, which will then stand at £70,120.

During the past year Messrs. M. Meade and Sons completed their contracts for the erection of cottages on the lower and middle sections of the Mount Temple estate. All of these houses are now tenanted. A contract was entered into with Mr. George J. Crampton in February last for the erection of 280 cottages on the middle section. Notwithstanding the serious loss of time caused by the bricklayers' strike, early in the year, good progress has been made with this contract, and some of the cottages will be ready for occupation before the end of January, and the remainder in sections from time to time within the coming twelve to fifteen months. The flooding of Little Bray, where a portion of the Company's property is situate, caused serious damage to the houses, as well as destroying in a great measure the furniture of the tenants, whose bedding was rendered practically useless. Under the circumstances, the Directors felt justified in granting supplies of new bedding to the tenants, and in foregoing rent for a short period. The damage to the houses necessitated a considerable outlay, which has been charged against the Depreciation Fund.

## "THE WALL FAILURE AT CROYDON."

Although completely overshadowed by the Charing Cross catastrophe, the collapse of a wall last week at the Croydon Palace of Varieties was sufficiently serious to demand attention. At the time of the accident the roof and all interior details of the theatre had been removed, leaving nothing but the shell, and the contractor had commenced to build a 9 in. wall, intended to strengthen the 14 in. western wall of the structure. The outer wall measured about 60 ft. long by 32 ft. high, and when the new work had been carried up to the height of 15 ft., the upper portion of the old wall fell inward without warning, carrying the scaffolding with it, and burying nine men beneath the debris. Unhappily one man was killed, but the others were fortunate enough to escape with more or less serious injuries. From the evidence given at the coroner's inquest it appears that the two walls were 10 ft. apart, the scaffolding being be-

tween them, and it is significant that the clerk of works had noticed a week before "that the intervening space was getting small." The use of a plumb line showed the top of the wall to be 3 in. out of the perpendicular, but whether this represented recent movement or long-standing settlement we do not know. If the contractor did not know, the application of shoring would be an obviously desirable precaution, for although an inclination of 3 in. in a height of 32 ft. is not necessarily dangerous it would be so if caused by the cutting away of brickwork for tying the two walls together. The contractor's manager stated that chases had been cut in the old brickwork  $4\frac{1}{2}$  in. deep by 12 in. high by from 2 ft. to 5 ft. wide, and 2 ft. apart vertically. He also admitted that the piers—1 ft. 9 in. thick and spaced 10 ft. apart—had been cut into to the extent of  $2\frac{1}{4}$  in. in each bond." The clerk of works stated that an ornamental bond course existed at the height where the wall broke, "and there was not a proper bond." All these things taken together ought to have suggested the necessity for efficient shoring, and we fully agree with the opinion given by the majority of the jury "that more precaution should have been taken in shoring up the wall."—*The Builder*.

## THE MINERAL RESOURCES OF KERRY.

On behalf of the Department of Agriculture and Technical Education, Mr. E. St. John Lyburn, Mining Engineer, has lately inspected and reported upon the mineral resources of "the Kingdom of Kerry," and we regret to say his conclusions are not such as to warrant the hope of any great development in that part of Ireland. As regards coal, he could find no evidence of any trace bearing coal formation which would carry good payable coal seams.

The slight indications of iron deposits showed no indication of any workable deposit; and the same applied to lead.

Clay of a character suitable for the manufacture of bricks was found in small quantities, but nowhere sufficient to constitute any serious commercial value. Even lime was found to be very scarce. The limestone and sandstone suitable for building are scarce, and Mr. Lyburn considers only equal to the demand of a small local trade. We may add that in most parts of Kerry stones suitable for chiselling is scarce, and, consequently, the use of cement concrete is increasing. The only mineral that he considers of any practical value is the red marble found near Castleisland. Of this he says:—

Along the main road from Castleisland to Killarney, and about  $1\frac{1}{2}$  miles south of Castleisland, there occurs a quarry containing red marble. This marble is capable of receiving a good polish, and appears to be of a durable nature. There are indications of a large deposit, and I am of the opinion that it could be raised in large blocks. I consider this marble quarry is worthy of the attention of some firm who are already in the marble trade and who could therefore find a market for the material.

We are afraid that the net result of this report is to dissipate any hopes that may have existed as to the possibility of Kerry being possessed of any mineral wealth.

## FLAT ROOFS.

In our issue of 13th inst. we answered a correspondent's query on the subject of flat roofs, he having asked us to enumerate the advantages and disadvantages of flat roofs. Since then we have learned that Messrs. Homan and Rogers, of 10 Marsden-street, Manchester, lay a floor consisting of their pure rock asphalt laid upon boards, and we understand that most satisfactory results have been obtained by this method at a remarkably low cost. The floor is practically everlasting, but, of course, when simply laid upon boards is not fire-resisting. Messrs. Homan and Rogers therefore recommended an asphalt flat being laid upon concrete, which has the further advantage of keeping the rooms below cooler in summer and warmer in winter.

So much attention has of late been given to the subject of flat roofs abroad, where they have been popular for so many years, that we are assured our readers will welcome any fresh information on the subject. In addition to the fact that the use of a flat roof substantially reduces the cube contents of a given building, it has the great additional advantage in a crowded city of affording an open air space that will perfectly fulfil the purpose of a yard or garden. It is no uncommon thing to find in big cities that the buildings, even those used as private dwellings, occupy every square inch of the ground, leaving not so much available for a yard as would swing the proverbial cat; besides this, in high buildings in congested quarters, the health of a small yard space at the ground level is of comparatively little value, while it needs no demonstration to show that a flat roof covering the whole area of the site, and situate at the very highest level of the building, has attributes of great value.



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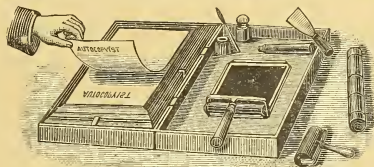
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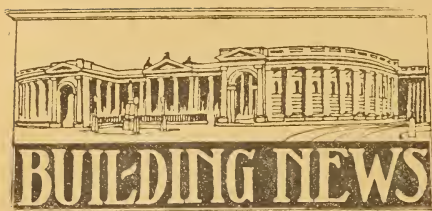
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**Belfast.**—The new chancel at All Saints', University-street, Belfast, was consecrated by the Lord Bishop of Down and Connor and Dromore. The church was built in 1898, and is now one of the largest and most beautiful in the city. The new chancel was carried out by Messrs. H. Lavery and Sons, under the supervision of the architect, Mr. W. J. Fennell. The sub-contracts were placed in the hands of Messrs. R. Patterson and Co., electric lighting; Messrs. Musgrave and Co., heating; Messrs. Clokey and Co., leaded lights; Mr. S. N. Gray, internal plumbing; and Messrs. Riddell and Co., communion rail. The design is a plain treatment of the Early English Gothic, a style that lends itself generously to ecclesiastical work.

**Drumshambo.**—Mr. James A. Stewart, of the Academical Institute, Boyle, is preparing plans for an electric lighting station for Mr. C. S. Laird, at Drumshambo, who intends to supply electric current to that town from the Drumshambo corn mill as well as revive the milling industry.

**Dublin.**—At a meeting of the Irish Industries' Association, a discussion took place with reference to the slates to be used on the new Training College at Glasnevin. The Association having written the Chief Secretary on the matter, Mr. Bryce replied, stating that the published correspondence with his predecessor (Mr. Long) gives a full explanation of the circumstances in which English slates were specified. It appears that the contract was definitely entered into some time ago, and in these circumstances he (Mr. Bryce) is unable to intervene in the matter. The council agreed to direct the attention of the Chief Secretary to the fact that his predecessor gave the assurance to Mr. Field in the House of Commons that Irish materials would be used where possible.

**Donaghedy.**—The Building Committee of the Presbyterian Church are prepared to accept tenders for the erection of a manse. The tenders to be delivered before the 27th inst., addressed to James Clarke, Esq., Lisdivin, Strabane. Mr. John M. Robinson, architect, Londonderry.

**Kingstown.**—It is the intention of the Urban District Council of Kingstown to appoint an architect or firm of architects to prepare plans for a new scheme of baths (Royal Victoria), to include open sea-bathing for ladies and gentlemen, warm baths, and enclosed swimming baths, at a net cost not exceeding £6,000, and to carry out the work on terms to be arranged with the Baths Committee, subject to the sanction of the Council. Applications will be received on the 1st of February.

**Lurgan.**—The Rural District Council will, on 1st prox., appoint a competent person to supervise, under the architect (Mr. J. W. Walby, C.E.), the erection of twenty-nine labourers' cottages and the performance of incidental work.

**Mayo.**—The Mayo County Council received tenders for the undermentioned work:—To improve the water outlets in concrete approach walls of Achill Swing Bridge.

**New Ross.**—A meeting of the New Ross Memorial Committee was held in the Tholsel, New Ross, for the purpose of considering tenders for the preparation and erection of a pedestal for the '98 Monument to be erected in that town. The following tenders for the work were received:—Messrs. Fegan, Wexford, £340; Mr. E. O'Shea, Mayor of Kilkenny, £198; Mr. P. O'Keeffe, Waterford, £285 10s.; Mr. Patrick Molloy, Callan, £180. Mr. Molloy's tender, being the lowest, was unanimously accepted.

**Trim.**—The Urban District Council will, on 5th prox., appoint a surveyor to carry out the duties as stated in Vanston, page 590.

**Wexford.**—A new shrine altar, the gift of Mr. James Hayes, Toronto, has been erected in the Church of the Sacred Heart, Ferrybank. The altar, which is from the design of Messrs. Ashlin and Coleman, architects, is of the decorative Gothic style, in keeping with the church. It was executed by Messrs. Malone and Co., 30 North Strand-street, Dublin, in a manner that proves that Irish workmanship can still hold its own. The centre panel under the altar table is of Carrara marble richly carved, with perforated monogram, having a background of blue Venetian mosaic. The side panels are also of Carrara marble, carved. The columns at either side are of best Siena marble,

surmounted by carved capitals in Sicilian marble. The cornice and altar table are also of best Sicilian marble, moulded and polished. The reredos up to the springing at the arch is of Sicilian marble, with richly-carved and highly-polished tracery panels at either side; the columns at either side are of Emperor's red marble, with capitals carved in Sicilian marble. The centre panel at the back of the beautiful statue of Our Lady is carved and moulded and enriched with rays and stars. The statue itself, which, it may be remembered, formed an imposing ornament of the old church, stands on an octagonal base of Sicilian marble rising from the altar table. The head of the altar consists of three concentric arches of best Caen stone and nicely fits into the arch of Bath stone set up in the building for the purpose. The centre arch consists of tracery panels, of which there are three at either side. The outer arch is deeply moulded and ornamented with carved crockets, while the inside arch is deeply moulded with cusping, and has carved bosses at the ends.

## IMPORTS.

### PORT OF DUBLIN.

January 11th, per Dunmore Head, from St. John's, N.B., 916 loads firwood (sawn), to order; per Lady Roberts, from London, 1,000 sacks cement, J. Kelly and Son; 50 packages lead, Thos. Dockrell, Son, and Co., Ltd.; 13 do., do., H. Sibthorpe and Son.

January 13th, per City of Hamburg, from Rotterdam, 6 cases window glass, to order; per Cassel, from Dunkirk and Shoreham, 63 tons slates, to order; 280 tons cement, W. Richardson.

January 15th, per Lady Olive, from London, 16 packages lead, H. Moore and Alexanders, Ltd.; 13 do., do., Hoyte and Son.

January 17th, per Gro, from Christiania, 97,633 pieces flooring boards, 9,233 pieces deals and battens, T. and C. Martin, Ltd.; 608 pieces deals, W. and L. Crowe, Ltd.

January 18th, per Eller, from Chester, 200 tons bricks, T. Scott.

January 19th, per Varna, from Fredrikstad, 17,159 pieces scantlings, 2,000 bundles laths, 33,761 pieces planed boards, J. Kelly and Son; 38,207 do., do., R. Martini and Co.; 21,407 do., do., T. Archer; 18,460 do., do., T. Dixon and Son; 2,400 do., do., to order.

January 20th, per City of Stockholm, from Rotterdam and Ghent, 2 cases window glass, 5,640 bags cement, to order; per Belfast, from Baltimore, 52 hickory logs, 1,136 bundles maple, 2,997 bundles firwood, 108 bundles, 1,414 pieces wood (sawn), 83 tons roofing slates, to order.

January 22nd, per Lillebonne, from Treport, 216 bags plaster 6 cases fibre cement, 2 cases glass, to order; per Lady Hudson-Kinahan, from London, 440 sacks cement, J. M'Ferran and Co.; 16 packages lead, T. Boyd.

"The Model Village and its Cottages, Bournville," is the title of an attractive book by Mr. W. Alexander Harvey, consulting architect to the estate, which Mr. B. T. Batford is about to publish. The book gives an interesting account of the village, together with much information on cottage building and the arrangement of model estates, and it is illustrated by plates from photographs and drawings, and numerous plans of cottages.

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# ENGINEERING SECTION.

## ITEMS.

We are informed that the Secretary of State for India will, during the coming summer, make at least ten appointments of assistant engineers to the Public Works Department of the Indian Government. Applications must be made on the authorised form, obtainable from the Secretary to the Judicial and Public Department, India Office, Whitehall, London. Graduates of a University who have obtained the degree of B.Sc. with honours in engineering will be eligible to compete for the post.

To read the Canadian building records for 1905 is calculated to make Irish architects and engineers turn their thoughts to the West. The approximate value of building in Montreal, Toronto, and Winnipeg alone amounts to six millions sterling. The figure is nearly equally divided between the three cities, which makes the case of Winnipeg, with a comparatively small population, extremely remarkable. In Toronto the building permits for eleven months in 1905 numbered 2,933, as against 1,620 for the same period in the previous year. The growth of factories is particularly noticeable, and in the residential districts there are so many new houses in course of erection and such a number of roads, sewers, etc., under construction that the whole can only be compared to the making of an exhibition.

To those who use electricity, and often to those who supply it, the Demand Indicator is a great mystery. The *Electrical Times* relates a good story of a man, who, knowing more of politics than electricity, took an engineer to see his indicator, and with great merriment, at the expense of the supply authority, pointed out the "funny meter." "What's up with it?" was asked. "Why," he replied in great glee, "it went like blazes the first day, and has never read anything since." Which reminds one of an "Assistant Mains Superintendent" who obtained a reputation for knowledge by a clear and lucid explanation of the indicator. "Sure," said he, "the indicator tells you how to get the price down. When you use all your lights the stuff runs up the tube, and after you have filled the tube you get all your current at 2d. per unit." The reputation was burst when the quarterly bills came in. The stories may sound somewhat exaggerated, but the system of the sliding scale is so intricate as to be incomprehensible to the ordinary consumer, and much friction is caused when his ideas have to be altered to suit the facts of the consumption.

The Arterial Drainage Commission might, with some propriety, fix over the door of its premises in Kildare-street, the motto "Festina lente." After the few meetings held early in January it was decided, so we are informed, to adjourn until the middle of February, and we assume this is the assimilative period. At such a rate of progress, the present generation need expect no solution of the problem, the consideration of which has already occupied so much time with so little result. The main question would appear not to be how best to improve the flooded areas, but who is to control the work and the expenditure. We offer two solutions, one to create yet another government department, the second to give the County Councils unlimited control. Whether the latter would be more successful in their management of waterways than they are in their maintenance of the high roads can merely be a prophecy, but with a lively recollection of cycle and motor tours through the midland counties of Ireland, and a recent experience of ostensible repair in Upper Merrion-street, we can confidently assert that the management cannot be worse.

Mr. William Marriott, M. Inst. C.E., writes to the *Times* in reference to the Charing Cross Station disaster to the point that iron is much less liable to corrosion than steel, which we think is a widely acknowledged fact. He states that, as a rule, it is difficult to tell iron from steel, except by the fracture; but given two structures side by side of iron and steel respectively, it is the easiest thing in the world for a practical man to tell which is which, simply by the nature of the corrosion. Cases can be given of iron bridges nearly thirty years old in perfectly good order, but which have been strengthened with steel additions, and the latter, in spite of efficient maintenance, are badly pitted and corroded. Unfortunately, at the present time, there is a difficulty in getting iron plates, and engineers are practically driven to use steel. More care should be taken in the manufacturer's yard, and the rusting process on steel never allowed to commence, for once in operation it is a very difficult matter to stop it. If engineers refused to put any rusty plate or angle in a girder a large subsequent maintenance bill would be saved.

Sir Charles Metcalfe, on his return from an interesting journey from the Zambesi to the Congo Free State border, relates some instructive facts as to the progress of the Cape to Cairo Railway. The work appears to be unparalleled in rate of execution. About a fortnight ago the railroad had reached the Kafue River, 260 miles beyond the Victoria Falls, and at this point a bridge, 1,600 feet long is being constructed to cross the stream. Northward of this point, the earthworks are practically completed for a further distance of seventy miles, and it is expected that the line will reach the Broken Hill mines, 347 miles north of the Zambesi, by June. The line is being laid at the rate of a mile a day, and on one occasion 5¼ miles were laid in ten hours. A sceptical French engineer, who had been superintending the construction of railways in French West Africa, did not credit the fact that more than half a mile a day could be laid, but when he visited Rhodesia, in order to prove the efficacy of their methods, the British engineers laid a quarter of a mile in twenty minutes for his benefit. Such record results can only be obtained by splendid organisation and the strictest attention to detail, and it is encouraging to find that, in this instance, our own engineers are forming a standard far ahead of their confreres in America and on the Continent.

In automatic signalling arrangements, there is always a distinct danger of some small disorganisation of the mechanism which would cause failure at a critical moment. This apparently occurred, and brought about a collision, at Mill Hill Park Station on the District Railway in November last. On this part of the line the signals are worked by the electro-pneumatic system, and a train, entering or leaving a block section, automatically places the intermediate signal at "danger" or "safety" respectively. In addition, a patent train stop apparatus is provided, and when the signal is at "danger" a trigger on the train is actuated, by means of which the brake valve is opened and the train stopped. The Board of Trade report on the accident has just been published, and from the evidence and the opinion of the inspector, Major Pringle, it is apparently clear the signal was at danger, and that the trigger actually struck the stop, but with insufficient force to bring the brake mechanism into play. The chief danger about automatic signalling is that it tends to lessen the responsibility of the individual, and it is therefore most important that absolute reliability, under all conceivable circumstances, should be attained. The railway officials are naturally alive to this fact, and we understand that steps are already being taken to obviate the defects revealed by the Ealing accident.



The most startling feature of a startling general election so far has been the return of a vast number of labour members to the new Parliament, and, with one of their number a Cabinet Minister, some curious developments in legislation may be anticipated. A sturdy independent labour representation, if properly controlled and led, can undoubtedly do much to better the present deplorable condition under which the submerged tenth suffers; at the same time if it goes too fast and too far the existing depression in the majority of trades will become more acute, as capitalists become more nervous and operatives less inclined to put in a fair day's work for a fair day's pay. The outlook in the building trade particularly is extremely gloomy, with little work doing or in prospect, and the prices of materials rising by leaps and bounds. The "peaceful revolution," as the English papers describe it, which Great Britain has been undergoing for some few years past, and which is now nearing its zenith, has had a very depreciative effect, and the attempted remedy of Tariff Reform has met with so violent a death that it is doubtful whether it will be resurrected for a considerable period. The whole question has now passed into the hands of the workmen, and it will require all their honesty, energy and balance to enable the kingdom to maintain even its present position in the face of Continental and American competition. At the time of writing 45 avowed labour members have been returned to the House of Commons; of these, three, including the President of the Local Government Board, started their careers as working engineers.

#### AN IMPROVED RACKING COCK.

An improved racking cock for filling casks or barrels with beer or other liquid has been patented by Mr. T. Forsyth, of 1 Eaton-square, Terenure Park, Dublin.

From the accompanying illustrations and description, it will be seen that this cock complies with all the requirements demanded to ensure the greatest amount of work done in the shortest time, and in the simplest possible manner. This cock is so designed and constructed that the greatest area in waterway is obtained for a bung hole of given diameter. Although very light, it is quite strong and calculated for rough usage, while it is so simple there

is removed from the cask, thus avoiding the usual waste and mess occasioned by the liquid running out of the dip-pipe for some time after the cock has been hung up.

There is but one working part, viz., the plug, by a quarter turn of which a three-fold operation is performed without the aid of any independent cocks or valves.

As may be seen from the illustrations, Fig. 1 is an exhibit of the cock as it appears on view. Fig. 2 is a vertical section taken through the central axis of the plug, when the cock is open, showing (a) the hole in the plug, (a') the aperture to which the filling tube is attached, (a'') the aperture to which the dip-pipe is attached, through which the cask is filled, and (b) the hole in the plug which communicates with (b'), the aperture to which the air or fob pipe is attached, and (b'') the aperture through which the displaced fob and air are driven to the air pipe.

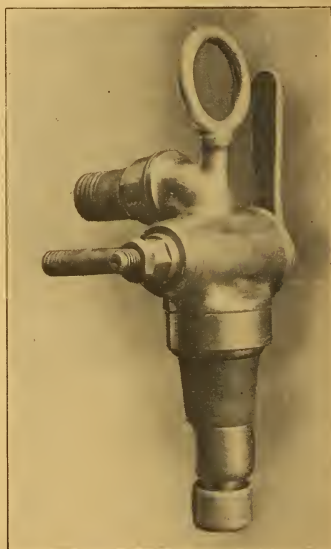


Fig. 3.

Fig. 3 is vertical in section, as in Fig. 2, when the cock is shut off. In construction of a racking cock there has hitherto been a loss of material as and when it was worked, by reason of its bringing up beer, etc., in the long tube, and this was lost by reason of its dribbling on to the ground when lifted from the cask. But this cock has three holes in the plug, each of which by a quarter turn of the plug produces one of three distinct operations, i.e., filling the cask, getting rid of the fob and air, and completely draining the lower portion of the cock and dip-pipe on removal from the cask, consequently preventing waste.

We understand that Messrs. Arthur Guinness, Son and Company have adopted this patent. We hope this is accurate, and can congratulate Messrs. Guinness in that event of having got hold of an excellent invention, and one calculated to put an end to loss in racking, and we can congratulate Mr. Forsyth in having turned out a "long felt want" in the simplest manner and at the lowest cost.

Mr. Arthur Heron, C.E., has been appointed an engineer under the Conjested Districts Board.

is absolutely nothing to go out of order. By undoing a couple of screws the entire cock is accessible for inspection and cleaning.

A feature of the patent is the ingenious yet simple device of venting the dip-pipe, which is done merely by the action of shutting off the cock, causing all that portion of the cock below the plug to be free from liquid immediately the cock

The *Westmeath Guardian* announces that Mr. Louis O'Callaghan, son of the late Mr. J. J. O'Callaghan, has been appointed by Most Rev. Dr. Gaffney, Architect to the New Diocesan College, in succession to his father, and the works will suffer no delay. The appointment has been made with the concurrence of the Vicar-Capitular and building committee.

### SEWAGE PURIFICATION WORKS FOR SMALL POPULATIONS.

By ARTHUR J. MARTIN, Assoc. M. Inst. C.E., M.R. San. I.

It is often assumed that the design of sewage purification works for a private house or small institution is a much simpler matter than where the sewage of a large town has to be dealt with, but the author's experience with a large number of sewages of both classes, some of which, as at Yeovil, Manchester, and Leeds, have been highly charged with manufacturing refuse, points to the conclusion that the sewage from a single house is often more difficult to treat than that of a large town. There are several reasons for this.

In the first place the amount of work to be done in a town can generally be ascertained beforehand with some degree of exactitude. The present population and the rate of increase are known, accurate information as to the volume of the water supply is often available, and in many cases the sewers are already in existence, so that the flow therefrom can readily be gauged.

In a private house, on the contrary, especially if it is a new one, it is often a matter of the greatest difficulty to ascertain, even approximately, how many people are likely to inhabit it, and it is seldom that any reliable information as to the amount of water consumed can be obtained.

Furthermore, the population of a town is generally fairly constant, or, if it varies, as in the case of a watering-place, the limits within which such variation takes place are known, and the resident population always forms a large proportion of the whole. The variations in the number of occupants of a country house are usually much greater, and do not take place with anything like the same regularity.

The designer of a private sewage purification plant must, therefore, run the risk, on the one hand, of making the works too small, or, on the other, of spending money unnecessarily in providing more accommodation than is actually required.

The sewage of a single household, moreover, presents wider differences in composition and strength than that of a larger population, which tends more nearly to an average; and in the case of a town a representative sample of the sewage can more often be obtained for analysis than in that of a private house.

From houses of the class for which private sewage disposal works are most often required a very large amount of grease is usually sent down the drains. This occurs also at certain public institutions, more particularly at asylums. At one institution with which the author had to deal the waste of fat was enormous, and great difficulty was experienced in inducing the authorities to take proper measures for its interception.

It is to be feared that cases in which fat is present to such an extent as to exert a marked effect on the purification of the sewage are by no means uncommon. The difficulty which it causes is often aggravated by the fact that it reaches the purification works in a liquid state, its sojourn in the drains being too short to allow it to cool and solidify. The consequence is that it forms a coating over other solid matter, thus to a great extent shielding it from effective bacterial action.

It may be noted in passing that grease traps, where they occur, are generally too small, and in too many cases they are not properly looked after. Their action would be greatly assisted by allowing the scullery waste to run for a short distance in an open channel before it enters the trap.

Another substance which is sometimes present in sewage in such quantities as to cause appreciable difficulty in its purification is soap. In the sewage from a private house the amount is rarely so great as to give any trouble; but in institutions which take in washing, or in asylums where a great deal of foul linen has to be washed every day, very large quantities are often used. In one case which came under the author's notice recently the amount of anhydrous soap found in an average sample of tank effluent was no less than 32 parts per 100,000. This is, of course, irrespective of the quantity destroyed by use, and in the preliminary treatment, and takes no account of the proportion of moisture which soap always contains. The difficulty caused by soap is due partly to its intractability, and to the large amount of oxygen which it absorbs, and partly to the greasy and offensive slime which it forms on the surfaces of the filtering material.

The fat and soap are by no means the only enemies with which the engineer has to contend in dealing with the sewage of public institutions is shown by the revelations made in connection with a case which recently came before the magistrates at Epsom. It was stated in the course of the trial that sugar, margarine, and even bacon, were

melted and sent down the drains, and that pepper, mustard, and condensed milk were got rid of by the same channels. The effect on the sewage purification works was not stated; but there is little doubt that the manager must occasionally have had a very trying time.

The sewage of private houses and of infectious diseases hospitals often contains large quantities of disinfectants; and while these, if used in reason, should not interfere to any serious extent with its purification, certain kinds, such as bichloride of mercury, when present in too large a proportion, are very inimical to bacterial action.

A further illustration of the difficulties which are met with in dealing with the sewage of small communities is afforded by the case of a small installation which was laid down under the author's advice some years ago. As a rule it did its work satisfactorily; but occasionally there was a marked falling off in the results, and the liquefying action of the septic tank seemed to be temporarily suspended. Inquiry disclosed the fact that the drains around the house were subjected to a quarterly cleansing, hydrochloric acid being used for the purpose. Under these circumstances it is hardly surprising that the purification works were subject to recurring and severe attacks of indigestion.

Cases are occasionally met with, more often in connection with a village than with a mansion or public institution, in which, for want of an adequate water supply, the sewage is excessively strong. It is generally believed that bacterial purification processes are inhibited when the sewage is concentrated beyond a certain point; and evidence was given before the Royal Commission on Sewage Disposal to this effect. While it is probable that the limit in question is seldom reached in practice, and that any sewage can be effectually dealt with in suitably designed works, a real difficulty is presented by the practical certainty that sooner or later a proper water supply will be provided. A purification plant designed to meet the present need will, therefore, in all probability become inadequate in the course of a few years, while if the works are laid down of the full size at the outset, they will not only be far too large for the immediate requirement, but will be incapable of effecting the high percentage of purification which the concentrated sewage requires.

Apart from all differences in the original composition or strength of the sewage, there is a further consideration which is too often lost sight of in the application to small installations of the data obtained from works on a larger scale. The sewage of a city or large town is generally collected at a considerable distance from the outfall. During its passage through the sewers the solid matter is subjected to a process of continuous disintegration, so that it reaches the purification works in a more or less finely divided state. This is particularly noticeable where pumping is resorted to. Over and above this mechanical breaking down of the solid matter, the sewage undergoes in the sewers a preliminary bacterial action, which is of great importance in its subsequent treatment. In particular, the whole of the urea, containing a large proportion of the nitrogen in the sewage, is often decomposed before the latter arrives at the outfall. The purification works of a large town are thus relieved of an important part of the work which would otherwise fall to them, while smaller installations, which, as a rule, receive their sewage in a comparatively fresh condition, have this work still to perform. This consideration is often lost sight of in the design of small septic tanks, the duration of stay provided for in them being only the same as is found to suffice in larger works, with the result that the tanks have sludged up in a surprisingly short space of time, and large quantities of undigested solid matter have passed on to the filters.

There is another circumstance which leads to the escape of solid particles from a small septic tank, and which often does not receive the attention which it deserves—namely, the disturbance caused by the inflow. In tanks of considerable length there is ample room for the incoming sewage to come to rest, even where the inlets are not arranged to the best advantage. In a small tank, on the other hand, the inlet and outlet are so close together that the disturbance caused by the one is communicated almost immediately to the other, with the result that appreciable quantities of organic matter are washed out of the tank. This tendency is aggravated by the fact that the sewage comes down in flushes, which, where the drains are short, arrive at the works in something like their full force. The emptying of a bath or washtub causes an enormous disturbance in a small tank, to the contents of which the discharge even of a water-closet bears a greater proportion than that of a large flush tank to those of the septic tanks serving a town.

Passing on to considerations of a broader nature, we come first to the question of choice of site. For dealing with the sewage of a town or village, a suitable site can



generally be found somewhere in the neighbourhood, and the Local Authority can obtain compulsory powers for acquiring it, which are denied to private owners and to the governing bodies of many public institutions. The latter must, therefore, as a rule, deal with their sewage on their own land, which generally means that the sewage works must be in fairly close proximity to the house or other building. In such a case the utmost care must be taken to prevent smell from the works, in addition to which it is sometimes necessary to render the latter invisible.

Where, on the other hand, a site can be obtained at some distance from the house, its utilisation often involves a difficulty of another kind, namely, lack of the fall which is absolutely necessary for any complete system of purification. Of this, as little as 9 in. or 1 ft. may be made to suffice, while from 4 ft. to 6 ft. is desirable, undue limitation in this respect involving a material increase in the extent and cost of the works.

In dealing with the sewage of a town, where it is possible to use gradients of 1 in 1000, or even flatter in case of need, a thousand yards of outfall sewer, more or less, do not entail any serious loss of fall; but to convey the sewage of a single house to any such distance, at the flattest gradients which it is considered safe to use in such cases, some 30 ft. or 40 ft. of fall is required. It is often impracticable to obtain anything like such a fall, except by pumping. The construction and operation of a pumping plant involve more expense and trouble than most private owners are willing to face, and are no light matter for an institution or good-sized village.

The difficulty of lack of fall has been met with in several cases with which the author has recently had to deal. He has overcome it by liquefying the sewage at the head of the outfall drain, whereby he has been enabled to carry the effluent to filters at any desired distance in a sealed main without appreciable fall.

Unnecessary difficulty is often caused by postponing the question of dealing with the sewage until after the drains have been laid, and using up in the latter the whole of the available fall, leaving none for the outfall drains and purification works.

Gradients of 1 in 40 and 1 in 60 are very desirable for house drains where the necessary fall can be spared; but where their adoption involves difficulties in the disposal of the sewage, flatter gradients should be used, which, with due care in laying the pipes and proper means of flushing them, may quite safely be done.

The difficulties inherent in the purification of small quantities of sewage are enhanced to no small extent by the limitations under which one has to work in dealing with them. The restrictions imposed by proximity to buildings have already been referred to. Not less important are those due to the scale of the works. In treating sewage in large quantities the engineer may avail himself of every device whereby labour can be saved or the efficiency of the treatment enhanced. In a small installation, on the other hand, such elaboration of the design would be quite out of place, partly on the ground of cost, but chiefly because the refinements which are natural and proper in large works involve undue complexity when reproduced on a small scale.

There is yet one other disadvantage under which the small installation labours as compared with larger works. The latter are almost invariably placed in charge of an attendant, who may or may not devote his whole time to them, but who does, at all events, pay them a visit every two or three days. The small domestic installation also has its nominal caretaker, who is generally a gardener, or other functionary about the place; but his interest in his charge and manner of performing his duties only too often present a marked contrast to those evinced by the trained sewage works manager. The fate of the small installation is well illustrated by a case which came under the author's notice a couple of years ago. The works comprised a septic tank and three filters, two of the latter constituting the working set, and the third being held in reserve. In order to bring the spare filter into use, it had to be connected with the supply and discharge pipes respectively, a very simple operation for which plain printed instructions were provided. After a time complaint was received that the filters were not working properly. It would have been a miracle if they had been, for the author, on proceeding to the spot, found filters Nos. 1 and 2 connected with the supply pipe, and Nos. 2 and 3 with the discharge. The mistake was pointed out and duly rectified, and for a while everything went smoothly. At the end of a few weeks, however, more complaints were received, when it was found that precisely the same mistake had been made as on the former occasion. The caretaker was an intelligent man, whom it would be an insult to describe as incapable of understanding his duties, and the author has little doubt that, had there been more for him to do about the installation, the work would have engaged his more serious attention. In other cases works have been left absolutely without attention for

months at a time. Experiences such as these pointed unmistakably to the necessity for making these small works as far as possible independent of attention, and so laid out as to leave no loophole whatever for error to creep in. The author has accordingly in his later work kept this consideration steadily in view.

He has set forth the difficulties met with in the design of small installations in considerable detail, not because they are insuperable, but because he believes that they frequently do not receive the attention which they deserve, the rules which apply to larger works being followed without due regard to the differences in the circumstances. In other cases little or no care is taken in the design of the works, the owner merely telling his builder to put in a "tank," and leaving it to his imagination to supply the necessary directions. A "tank" of a kind is accordingly laid down, bearing a more or less distinct resemblance to something which the owner or builder has at some time or other seen or heard of. It may happen by good luck that the "tank" meets the case, no actual nuisance being caused, and the effluent being discharged into a body of water which is not under the charge of a Rivers Board or other vigilant authority. In other cases trouble is experienced, and after a certain amount of fruitless tinkering a professional man is at last called in. By this time so much money has been wasted that the owner is reluctant to spend more, and especially loth to give up the "tank" upon which so much has already been expended, and with which the engineer has accordingly to do the best he can, when it would be true economy to start *de novo*.

It will now be convenient to sum up the requirements to which a sewage purification plant for a mansion or public institution ought to conform.

It should be unobtrusive, and capable of ready concealment in case of need.

It should give off no perceptible smell.

It should be simple, automatic, and as far as possible fool-proof.

For obvious reasons automatic working is particularly desirable in the case of hospitals in which infectious diseases are treated. In this connection it should be distinctly understood that no amount of skill in the design of an installation will remove the need for reasonable attention to cleanliness in its management. Inattention to this point has been the cause of the greater part of the nuisance which has been experienced from works of the kind.

In view of the fresh condition in which the sewage arrives at the outfall, the necessity for some form of preliminary treatment will be generally conceded. Mere screening will not, as a rule, suffice; and the frequent attention required by screens, and the liability to nuisance therefrom, render it undesirable to use them in such cases as those under consideration.

A defect of screening, as compared with more thorough modes of preliminary treatment, is that it does not effect that blending of the sewage which is desirable, especially in small installations, where its composition varies greatly at different hours of the day. Some form of tank treatment may, therefore, be regarded as absolutely necessary in such cases. Such treatment may be either chemical or bacterial; but chemical precipitation, while undoubtedly efficient for the removal of suspended solid matter, has certain drawbacks which will prevent its general adoption for small installations. Of these drawbacks the cost of the chemicals must be regarded as the least, the chief being the necessity for frequent attention, the difficulty of disposing of the sludge, and the risk of nuisance from the latter and from the tanks, which must of necessity be open.

It may be added that the chemicals commonly used for precipitation, unless their addition to the sewage is regulated with a precision which it would be hopeless to expect in small works, are found in practice to be inimical to the purification of the liquid. The preliminary treatment will, therefore, as a rule, be bacterial, and will take place either in cultivation tanks or septic tanks. Of these the author personally prefers the latter, largely for the reason that a septic tank, which may be completely hidden, can be used in situations where any open tank would be inadmissible.

In this connection it may be remarked that a great deal of nonsense has been spoken and written as to the alleged "enormous cost" of arching over septic tanks, and a roof of peat litter has been suggested as being permeable by the tank gases and at the same time deodorising them.

Inasmuch, however, as these gases will diffuse freely through concrete, and the overlying soil constitutes an excellent deodorant, a peat roof possesses no advantage over the more substantial covering, which will in most situations be preferable; and everyone who has any practical acquaintance with the subject knows that a concrete arch is in reality a comparatively inexpensive item.

One great practical advantage of covering a tank in this way is that it admits of the latter being placed on any site on which room can be found for it, not only without risk

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of nuisance, but without giving the slightest indication of its presence on the surface. It will, moreover, in no way interfere with the utilisation of the ground over it.

In view of the variations which take place in the population of a country house, which may at one time be crowded with visitors, and at another be occupied by only a few servants, it has been suggested that the septic tank therefore should be in duplicate, so that the working capacity may be made to conform in some measure to the flow. The same consideration applies to an infectious diseases hospital, which may be empty, except for a small staff, for months together.

Regarding the matter from a purely theoretical point of view, it is probable that for certain sewages an excessive stay in the septic tank may be in some degree disadvantageous. The author's own experience shows that any difficulty consequent thereon can in most cases be overcome without going to the expense of duplicating the tank. He is also convinced that, in small works at all events, there is nothing to be gained by subdividing the filter, and that the smallest flows, which are met with during slack seasons will suffice, if properly utilised, to keep a full-sized filter in good condition.

The great practical objection to duplication, apart from its cost, is that it renders the working of an installation dependent on the judgment and vigilance of the attendant. From a long experience of the way in which these small works are looked after, the author has little doubt that one tank or one filter would often be found at work when both are required, and *vice versa*.

Although some septic tanks seem to go on indefinitely without requiring to be cleaned, it is not safe to reckon on this; and facilities should always be provided for removing any residuum which may accumulate in them without first drawing off their liquid contents. The reason for this is two-fold. In the first place the emptying of the tank would destroy the septic condition therein, which might take some weeks, or even months, to re-establish, and, secondly, the process of emptying, especially in inexperienced hands, is liable to be a very offensive one. The removal of the mineralised residuum, on the other hand, may, if proper means are provided for the purpose, be effected expeditiously and without nuisance.

The final treatment of the sewage may be effected either by irrigation or in bacterial filters; but the treatment of sewage or sewage effluent on land in the neighbourhood of a house or public institution is liable, unless under exceptionally careful management, to give rise to nuisance. Under favourable circumstances the tank effluent may be got rid of by means of a series of open-jointed agricultural pipes laid just under the turf; but scrupulous care must be taken in the execution of the work, or failure is bound to result.

It will generally be found best to complete the purification in a bacterial filter or filters, and this course has the important advantage of placing the whole of the treatment of the sewage under ready control.

A sprinkling feed to the filter is an important aid to purification; but, inasmuch as the showering of tank effluent through the air is liable to give rise to a certain amount of smell, this method should not be used unless the filter is at a safe distance from the house. The exposure of the tank effluent may be avoided by the use of a contact bed, either alone or as a preliminary to a trickling filter. Whatever method of filtration is employed, the tank effluent should not be allowed to run into the filter continuously, but should be ponded until the proper charge has accumulated. By utilising the upper part of the septic tank for this purpose, the expense of a separate ponding chamber will be saved. For the ponding and release of the tank effluent the author has often used a very simple automatic gear, consisting merely of a supply valve, a discharge valve, a weighted lever, and a float on each of the valve rods. The working is as follows:—as soon as the proper quantity of effluent has accumulated, the float on the supply valve rod rises, opening this valve and closing the discharge valve. The tank effluent is then delivered to the filter, either through a series of perforated distributing pipes, or below the surface of the material, as the circumstances of the case may render advisable. If sprinklers are used, means should be provided for freeing the tank effluent of any suspended matter which it may contain, and which would otherwise choke the perforations. The author prefers fixed sprinklers to moving ones, at any rate in small installations, where the attention required to keep moving distributors in order would constitute a serious drawback to their use. A perfect distribution of the tank effluent over the surface of the filter is secured without movable distributors by simply varying the head on the orifices.

The weak point of the trickling method—namely, the tendency, which has been pointed out by several experimenters, for the effluent to find short cuts through the filter—is overcome by the use of a contact layer in the

bottom of the bed, wherein every part of the liquid is held for a short but sufficient period in contact with the filtering material. On the expiration of this period the discharge valve is opened, releasing the filtered effluent.

In dealing with an ordinary sewage, a single filtration, conducted as above described in a filter of adequate depth, will, in the majority of cases, effect sufficient purification; but for concentrated sewages of, say, two or three gallons per head, a second filtration may sometimes be desirable. In such cases the depth of the liquid in the first filter will afford the necessary head for the sprinklers on the second.

For filling the filters the author has found no material to beat ordinary furnace clinker, broken to a small gauge and freed of dust. In some localities there is a difficulty in obtaining clinker; but in no case within his experience has the difficulty proved insuperable; and it is generally worth while to pay the cost of carriage from a distance for the sake of obtaining a material which can be relied on to give satisfactory results.

As it is customary for writers who have used a particular process of purifying sewage to claim that their process is the best, if not the only one which should be employed, it may not be amiss for the author, while expressing his belief that the method which he has described is as simple and effective a solution of the problem under consideration as can well be found, to add that he is fully alive to the possibility that other methods, properly applied, may yield equally satisfactory results. His main object in this paper is not to inculcate any particular mode of purification, but to lay stress on the need, whatever method may be adopted, for carefully collecting and checking the data required for the design of the works, and especially for the utmost vigilance in watching for any circumstances which may by any possibility interfere with the process employed.

It may not be out of place to utter a word of warning as to the laying down of the works. Where these are small, and at a considerable distance from the office, there is always the temptation to save the owner's pocket by relying upon local supervision of the construction. In nine cases out of ten possibly this may safely be done; but in the tenth all concerned may find abundant reason to regret that the designer did not keep the superintendence in his own hands, even at the cost of what looks like a disproportionate expenditure of time and money in travelling to and from the work.

The care of these small installations also deserves more attention than it sometimes receives. In particular, written instructions should be provided, clearly and explicitly setting forth what the caretaker has to do, and, what is not less important, what he should abstain from doing. In the absence of written instructions there is always the risk of the man in charge leaving, and his place being taken by another who has not the faintest idea what he is required to do. Many breakdowns and much disappointment would undoubtedly be saved—especially where the owner himself does not take an active interest in the works—if these are periodically inspected by the designer. In saying this the author wishes to avoid any reflection on the large number of caretakers whose performance of their duties leaves nothing to be desired. There is, unfortunately, a minority who seem to be under the impression that the microbe does everything, leaving nothing to be done by the man, with disastrous results to the installation. To caretakers such as this an occasional surprise visit from the designer of the works will act as a wholesome stimulus.

In the foregoing pages the author has endeavoured to show that the efficiency of a sewage purification plant, on the smallest as well as the largest scale, is dependent on three factors, namely, its design, construction, and management, inattention to any of which will almost certainly result in failure, but that by the exercise of reasonable care in each branch of the work success may be assured.

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Last week at a Glasgow electric power station, Alexander Melville, a young engineer, took hold of a high tension switch, and a current of 6,500 volts passed through his body, killing him instantly. He was under the impression the current had been turned off.

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## ENGINEERING NEWS.

**Arklow.**—The Harbour Board are about to appoint an engineer to act on their behalf in superintending the carrying out of work connected with the extension of the pier, and drawing up plans for same. Applications were received from every part of the United Kingdom.—The following were selected from the number as being the most likely to perform the work satisfactorily:—Messrs. George T. Moore, engineer to the Rathfrum District Council; Owens, M'Donald, W. C. Gravely, M'Kie, Edward Lester, Hinde, Cheeke, Carr, Robert Haire, A. E. Carey, E. T. Beard, Barron, W. T. Douglas, Sir E. Bradstreet, J. J. Watson, J. H. Ryan, T. Neill, Wharton, Metcalfe, Coodeson, Matthews, M'Kaig, J. C. Legros, J. R. Barden, Griffiths, and Lowry.—It was decided to submit the foregoing list to the Lord Lieutenant, in order that he might select from it some of the engineers who had the most suitable qualifications.

**Dungarvan.**—APPOINTMENT OF ENGINEER.—The District Council at their last meeting elected an engineer for the new labourers' cottage scheme. A sub-committee of the Council, after examining the tenders, reported that on a comparison they found that Mr. Ryan's tender amounted to £20 and Mr. Barr's to £23 11s. 3d., and they approved of Mr. Ryan's tender as the lowest. Mr. Ryan was appointed.

**Londonderry.**—Mr. A. D. Price, Local Government Board Inspector, held an inquiry in the Guildhall relative to the decision of the Londonderry Corporation to abandon the proposal to build the proposed new Technical Institute in Society-street and erect the institute on a site on the Strand-road and Lawrence Hill. An inquiry had already been held by Mr. Cowan, the Local Government Board's chief engineering inspector, on the 6th June, 1904, and the sanction of the Local Government Board was granted to a loan of £12,000 for the purpose of erecting the institute on the Society-street site.

**Wicklow.**—The Town Clerk of Wicklow has received the following letter from Sir Antony MacDonnell, the Under-Secretary, in connection with the Free Grant for Wicklow Marine Works:—"Dublin Castle, Sir.—I am directed by the Lords Justices to state, for the information of the directors of the Dublin, Wicklow, and Wexford Railway Company, that their Excellencies approve of the allocation of the Government Free Grant for the

Wicklow Marine Works as follows:—Sea Coast Defences, £10,000; Harbour Works, £12,000. The guaranteed local subscriptions to be supplemental to the free grant.—Their Excellencies also approve of the Dublin, Wicklow, and Wexford Railway Company taking up the contract for the sea coast defences, the work to be carried out by the Railway Company's engineer, under the supervision of the Board of Works or of some other engineering authority employed by the Government for the purpose, upon whose certificate of satisfactory work done payments would from time to time be made out of the Government Grant.—I am, Sir your obedient servant, A. P. MACDONNELL. The Secretary, Dublin, Wicklow, and Wexford Railway Company, Westland-row, Dublin."—From the foregoing it will be seen that their Excellencies approve of the Railway Company's contract for the foreshore protective works, which are to be carried out under the supervision of Mr. S. J. Shannon, the Company's engineer.

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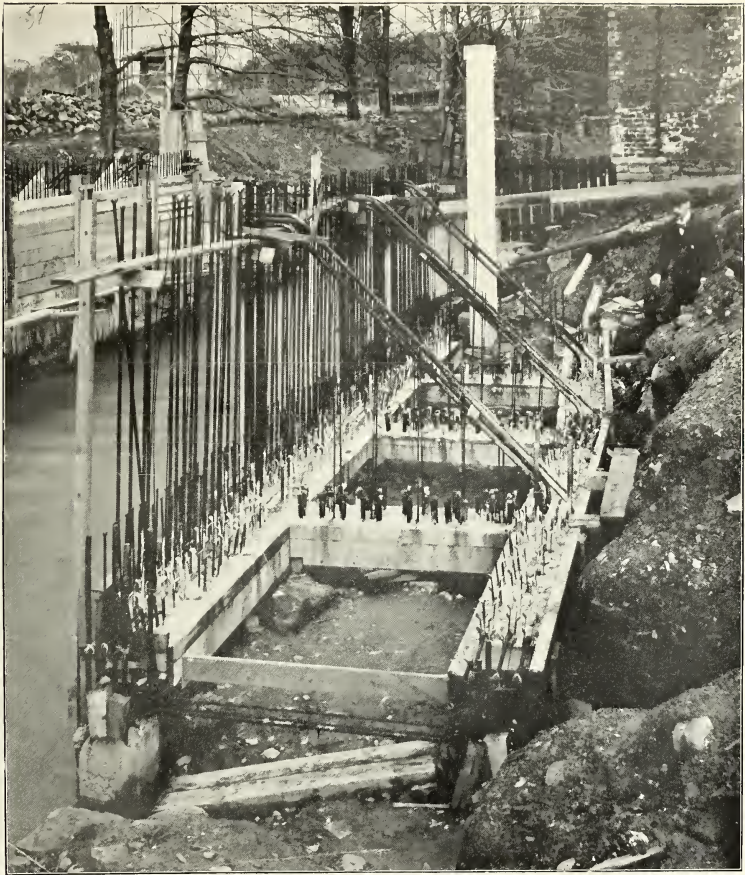
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## TOPICAL TOUCHES.

We hear that Messrs. Ashlin and Coleman have been commissioned to design the new Golf Club House at Portmarnock to replace that recently burnt down.

The Durrow Brick and Tile Co., Attanagh, Queen's County, have issued to architects and others a very attractive little blotter and desk calendar, with diary, as a small and useful reminder to bear in mind the excellence of their bricks when the user is writing his specifications.

Last week a very important deputation from the Parliamentary Committee of the Irish Trade Union Congress was received by Mr. Bryce, the Chief Secretary. In addition to many other matters affecting labour, the housing of the working classes, the amendment of the Unemployed Act, and the Workmen's Compensation Act were referred to.

Mr. Bryce was most favourable, but apparently declined to commit himself or the Government by any definite pronouncement. He said the Workmen's Compensation Act should be amended. We are glad to note he also declared that he intended to deal with the question of railway rates, and he hoped the canals would be made more available for goods traffic.

Mr. Bryce, in his reply, also dealt with the glaring anomalies of the Housing of the Working Classes, and said the procedure should be cheaped.

A great deal of this procedure is pure red-tape, hopelessly involved and ruinously expensive. The legal and incidental expenses of schemes under the Labourers' Acts and the Housing of the Working Classes Acts often constitute a most substantial proportion of the whole cost, and the worst of it is that no useful purpose whatever is saved by this cumbersome and costly procedure.

Two very interesting meetings of professional Societies were held in Dublin during the present week. On Monday night, Mr. W. N. Twelvetees read a very good paper on "Concrete Steel," before the Engineering and Scientific Association. We publish this paper in our present issue. On Wednesday the same author gave the Institution of Civil Engineers an exhaustive account of the Charing Cross disaster and its causes.

The work of building the International Exhibition Buildings has begun! Loads of timber are on the site, trees are being felled, and it is expected that soon some eight hundred men will be engaged in the work of rearing the imported structure—doubtless all the materials will soon arrive in Ireland. Meanwhile, the Institute of Architects, in words of unexampled vigour, made its protest against the methods adopted. Elsewhere we publish the report adopted by the members at a general meeting held on 1st inst.

The present year is the last during which it will be possible for architects to be elected Fellows of the Royal Institute of British Architects, without undergoing the ordeal of examination. Only persons over 30 years of age, and who have designed or executed works of some degree of merit are eligible. They must be nominated by three Fellows of the Institute. The proposer must have personal knowledge of the candidate's works. If the Council approve of the nomination the candidate is balloted for in the ordinary way. In the case of Irish candidates, before being balloted for their candidature must be approved by the Council of the Irish Institute.

Speaking at a meeting of the Royal Ulster Agricultural Society the other day, Lord Londonderry, speaking of the transformation lately effected in the system of land tenure in Ireland, urged upon the new owners of the land the responsibilities that had devolved upon them. He said that those who "were until recently occupiers, but are now owners, had incurred considerable responsibilities. They were now taking the place to a large extent of the former owners, and must bear the responsibility of ownership. It was their interest, as it was their duty, to cultivate the land to the best advantage, but he would impress upon them the importance of afforestation and the preservation and growth of timber. Where timber was grown the land was much more fertile. In the Ards district, where the landowners had shown foresight and prudence in planting, their land was richer and more fertile than elsewhere." Need we say how wholly we agree with these sentiments, and what a blessing and a profit to the land would follow in time were the advice followed, though it cannot be said that the class in Ireland represented by Lord Londonderry, ever realised their responsibilities in regard to re-afforestation. Once a great timber growing country, exporting its Irish oak, the Irish landscape has become notorious for its woodless character—that element and charm that excels all others in a pastoral scene. While scientists tell us that afforestation is well capable of changing a climate, rendering a dry and arid clime comparatively mild and pleasant in time, and an excessively moist one drier and more equable, we can all remember to have heard old men say that the climate of Ireland has changed for the worse since their boyhood. Can it be—is it too far fetched to suppose—that the ruthless destruction of timber in Ireland has had something to say to it?

We are, as we have said, wholly with Lord Londonderry in his views, but if his lordship's fellows did little or nothing to promote timber-growing in Ireland when they owned the land, their successors in ownership are likely—nay, certain—to do less, unless the State, as is its duty, steps in, and by a system of bounties, combined with common-sense legislation, encourages the growth of timber. Fish and game are preserved and protected by legislative enactments; timber has no close season. Bounties should be given for every young tree brought to a certain growth, and restrictive laws should be passed to compel those who cut down their timber to plant anew for the benefit of posterity. Ireland has long since ceased to be a timber-growing country, and a like state of things prevails in the finest timber bearing areas of Europe—so much so that the very ports of shipment have been varied.



## CONCRETE STEEL IN ENGINEERING PRACTICE.\*

By W. NOBLE, TWELVETREES.

Bearing in mind the facts that the United Kingdom was the birthplace of Portland cement, and was also the first country to employ this invaluable material in connection with iron in structural work, it is a little surprising that the scientific combination of concrete and iron—or concrete and steel as now more usual—has been chiefly adopted by other nations until quite recently.

Like many other useful ideas originating at home, that of combining the useful qualities of iron and concrete has now come back to us in the guise of a foreign invention, a mistaken view that may account to some extent for the feelings of distrust which some engineers still seem to entertain as to the strength and durability of the new material. It is by no means clear why an engineer who does not hesitate to design in concrete or in steel, should doubt the wisdom of dividing the work over the two materials. Instead of employing concrete in huge masses with the object of avoiding tension, or of keeping it within narrow limits, the quantity can be largely reduced by the introduction of steel to take up tensile stresses, only sufficient concrete being used to withstand compression to bind the construction together, and to protect the metal from the effects of corrosion and fire. Apart from the economy to be secured by applying each material in such a way that its characteristic properties can be fully utilised, important savings can be effected in maintenance charges, and notably by obviating the constant cleaning and painting upon which the permanence of ordinary steel work absolutely depends.

For many years the existence of reinforced concrete construction has been practically ignored in the United Kingdom while other countries have made wonderful progress in its development, but the time of awakening has already come, and numerous examples showing the application of concrete-steel in engineering and architectural practice are to be found in all parts of the British Isles.

This subject, represented by the title of this paper, is really of most comprehensive character. The origin and development of concrete-steel; the physical properties of its constituent parts; the principles involved in their scientific combination; the numerous investigations made into the properties of the combination and the theories resulting from such investigations, are all matters of great interest, any one of which would afford ample material for several papers. The different systems of reinforcement advocated by professional engineers and patentees, the methods to be followed in the preparation and subsequent use of concrete, the construction of moulds and centring, and the brief consideration of the more important works executed in concrete-steel during the last few years, are other departments of the general subject that present an interminable vista to the mental eye.

For these reasons the author has found it necessary to select some individual section of the subject for attention, and has decided that the valuable properties of concrete-steel may be generally indicated by describing and illustrating a few typical examples of construction chiefly to be found in the United Kingdom.

**Tuckton Bridge, Bournemouth.**—The first example taken is that of the new highway bridge rendered necessary by the extension of the Bournemouth system of electric tramways. This is the first concrete-steel structure of its kind in the British Isles, and was built by the Yorkshire Hennebique Contracting Company from the designs of Mr. F. W. Lacey, M.Inst.C.E., the borough engineer of Bournemouth.

The former bridge on the same site, a timber structure on iron piers, was too narrow for modern requirements and far too light for heavy tramway traffic. Consequently, it was purchased by the Bournemouth Corporation with the object of demolishing and replacing it by more suitable means of cross-river communication.

Operations were commenced about April last year, when half of the old bridge was taken down, the other half being used for the conduct of traffic during the operations of the contractors. The total length from bank to bank is 253 ft. 5 in. This distance is covered by twelve segmental arches and two semi-arches, one at each abutment. At the deepest part of the river channel there is a 41 ft. 2 in. span, all the other arches having the span of 25 ft. 6 in., the two semi-arches measuring 14 ft. 9 in. and 16 ft. 3 in. respectively, from the springing to the outer end.

The substructure is formed of 15 in. by 15 in. concrete-steel piles of the Hennebique type, driven in three longitudinal rows, the spacing of which accords with the spans of the different arches, and the rows are spaced 8 ft. 9 in. apart centre to centre, as shown in the horizontal and vertical

sections. The piles are driven to different depths according to the bearing power of the earth, the two outer rows being joined at the top, longitudinally by the arch ribs and transversely by arched beams, which serve, together with secondary beams and the road slab, to connect the whole construction into a rigid framework. The width between the outer surfaces of the piles is about 19 ft., but the total width of the bridge is increased to 29 ft. 6 in. between the parapets by cantilever arms spaced 4 ft. 3 in. apart, supporting two 6 ft. footways, between which is the roadway, 17 ft. 6 in. wide, carrying two tramway tracks.

The 41 ft. 2 in. arch was struck with a radius of 47 ft. 6 in., the 25 ft. 6 in. arches and the semi-arches with a radius of 20 ft. The arch ribs are formed with openings in the haunches serving to reduce weight, and adding considerably to the lightness and elegance of the structure.

All the arch ribs are about 5 ft. 3 in. deep at the springings, and 2 ft. 3 in. deep at the crown by 9 in. thick. The transverse arched beams connecting the heads of the piles are 3 ft. 9 in. deep at the springings, and 1 ft. 9 in. deep at the crown, by 9 in. thick, the intrados being segmental, and struck with a radius of 4 ft. 3 in.

Between each group of three piles in the 25 ft. 6 in. spans, the arch ribs are braced laterally by two transverse tie-beams, and each group of piles is connected longitudinally with the adjacent group by four secondary beams. Similar members are provided for bracing the 41 ft. 2 in. span. Over the system of supports formed by the upper surfaces of the arch ribs, the transverse arched beams, the transverse rectangular beams, and the longitudinal secondary beams a 6 in. slab of concrete-steel affords support for the paving of the roadway, and helps to bind the whole structure together.

Owing to the circumstance that the past summer was free from heavy rains, the contractors were able to complete the bridge sufficiently for the official tests, which were conducted in October, 1905, although some minor details still remained for execution.

The following are the working loads demanded by the engineer's specification:—

Roadway.—Moving load, two 12 ton trams; dead load, 140 lbs. per square foot. Footways.—Dead load, 140 lbs. per square foot.

Three separate tests were conducted under heavy, dead, and live loads, and showed a deflection of only 0.125 in., which must be considered entirely satisfactory, for the conditions were far more exacting than those due to the heaviest traffic that will be conducted on the bridge.

**Reedmouth Bridge, Northumberland.**—Expanded metal is a material which lends itself admirably to many types of engineering construction, and as an example the author takes the bridge at Reedmouth, a small village on the River Reed. This structure was designed and built for the Bellingham Rural District Council by Mr. John Rule, of Sunderland, whose tender was some 15 per cent. lower than the lowest of those for steel girder bridges.

The construction is of simple character and quite suitable for the requirements of small country districts where limitation of capital expenditure is a matter of considerable importance.

The bridge includes three girder spans, each of 43 ft. The roadway is 12 ft. wide between the parapets, and the platform slab 14 ft. over all, and the total length 136 ft. from end to end.

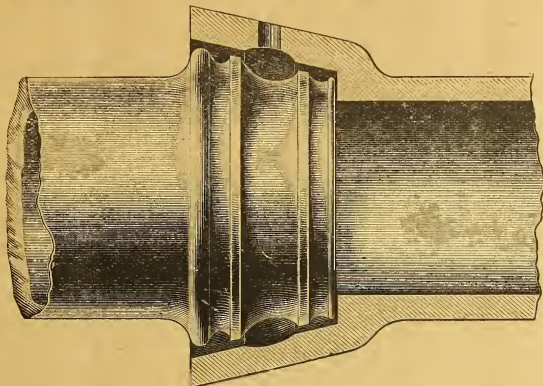
The general design will be made clear by the following description. The floor slab is supported by longitudinal girders, each consisting of a rolled steel joist with one extra flange plate at top and bottom and encased in concrete. Expanded steel is bent so as to pass from the inner side of one girder under the bottom, up the outer side, over the top, and then through transverse joists to the opposite girder, around which it is bent in the manner already described. The sheets of expanded steel passing through the concrete are bent to a curve approximately corresponding with the diagram of bending moments, and as the concrete in the girders and slab is monolithic, the whole construction really constitutes a single-hibed girder. The platform-slab is also reinforced with expanded metal as in an ordinary floor, and steel rods of small diameter run the whole length of the bridge, so that all parts of the concrete in tension are adequately reinforced.

**Transit Sheds, Manchester Ship Canal.**—The extensive range of buildings to which attention will now be directed comprises five transit sheds, built in connection with Dock No. 9 in the port of Manchester. These sheds, having a frontage of about 2,350 ft., extend almost from end to end

\* Engineering and Scientific Association of Ireland Meeting, Feb. 5, 1906.

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of the quay along the south side of the new dock, and have a uniform width of 110 ft.

The middle shed of the series is 450 ft. long, and the other 4 are 425 ft. long each, the whole series being connected by gangways or bridges joining the upper floors and the roofs of adjacent buildings. Each shed comprises three floors and a flat roof, virtually constituting a fourth floor. The height from the ground floor to the under side of the main beams of the first floor is 14 ft. 3 in., the height of the first story is 8 ft. 4 in., and that of the second story 8 ft. 7 in. These measurements are taken in each case to the under side of the floor beams. The height of the sheds from ground level to the roof is 45 ft., and to the ridges of the towers 51 ft. 3 in. All the roofs are flat, so as to be available for the storage of packing cases, crates, and merchandise not liable to injury by the weather, the collective storage area provided by the series of five sheds being about 950,000 square feet, or nearly 22 acres.

The floors of the first storey are prolonged to form a balcony 12 ft. wide along the south front of each building, except where interrupted by the towers. Another balcony, with a width of 4 ft., runs along the north front. The towers are used for hoisting purposes, and there are also turrets on the roof over the staircases.

Construction was commenced in July, 1903, and finished early last year, about six months in advance of the contract time, the total cost of the sheds, exclusive of fittings and equipment, amounting to more than £150,000.

For the purpose of facilitating the erection of the superstructure, a track was laid along the whole length of the sheds, front and back, upon which a travelling stage was placed, and moved from point to point as required. This stage was equipped with two concrete mixers of the Oehler type, each capable of making 40 cubic yards of concrete in ten hours.

The general method of construction being the same for each of the five sheds, it is only necessary to describe in detail a typical section of one shed.

The foundations are provided by concrete piers 6 ft. wide and 16 ft. deep, spaced 25 ft. apart from centre to centre.

Below the south front of the sheds the ends of the piers are connected by concrete arches 3 ft. thick, which were built without much excavation, as the earth was merely cut to the curve selected for the intrados of the arch, and, after being carefully dressed, was covered by concrete deposited upon it between timber shutters. By the adoption of this plan, the expense of excavation and refilling was entirely avoided, as well as that of erecting and removing moulds. Moreover, the arches receive valuable assistance from the solid earth, which has far greater bearing power than material repacked into an excavation.

Owing to the low level of the concrete piers, it was necessary to build the brick footings for the support of the column bases. These footings, about 7 ft. 6 in. square by 4 ft. high, are spaced 22 ft. apart, so that there are six of them along each of the concrete piers. Upon the brick piers are fixed cast iron base plates 4 ft. in diameter by 9 in. high, the top of each being level with the surface of the ground floor. The bases afford bearing for the steel bars forming the vertical reinforcement of the columns, and over them are placed dome-shaped shields of cast iron. These, being filled with concrete, serve to hold the columns rigidly at the base, and at the same time to protect them from accidental injury.

When all the reinforcement and the angle plates had been erected and temporarily secured in position, the cast iron bases and dome-shaped shields were filled in with concrete, which was well rammed. The column ends were then erected and shored up, one side of each mould being left open. The concrete was deposited in layers 6 in. thick, boards being fixed one at a time across the open side of the mould as each layer of concrete was finished. The concrete was mixed fairly wet, so as to make it easy to fill all spaces in the moulds, and it was rammed down until water rose to the surface, the ramming being performed by iron bars with a right-angled bend of 3 in. long at the end.

The columns on the ground floor were calculated for a normal load of 340 tons each, those on the first floor for a load of 226 tons each, and those on the second floor for a load of 113 tons each. These loads represent pressures of about 1,950 lb., 2,520 lb., and 2,100 lb. per square inch of cross-sectional area.

After the columns had been built up to the first floor level and left to harden for about a week, the main and secondary beams were formed in timber moulds extending from column to column. The main beams, 12 in. wide by 18 in. deep, extended from end to end of each shed, tying the tops of the columns together, and really constituting continuous girders.

The secondary beams, or joists, reach from column to

column transversely across the building, forming panels 25 ft. square, each of these rectangles being sub-divided by three intermediate joists, supported at the ends by the main floor beams.

The reinforcement in each of the main beams comprises nine longitudinal bars in rows of three abreast and numerous stirrups, also three abreast, placed 6 in. apart along the beam. Half of the stirrups pass under the lowest bars and half over the uppermost bars.

When the beam moulds had been erected and securely stayed, the spaces between them were filled by timber panels laid level with the upper edge of the beam moulds, and the whole surface was coated with a layer of limewash before the commencement of concreting.

The first step in this operation was to spread a layer of concrete, 1 in. thick, along the bottom of the beam mould, and, after well ramming, to place the lower set of stirrups in position. These stirrups consist of 12 S.W.G. steel strip,  $2\frac{1}{2}$  in. wide by 43 in. long, bent into U form, the two ends of each stirrup projecting through the top of the beam and afterwards incorporated in the concrete of the floor slab.

The stirrups, three abreast in the width of the beam, were spaced 6 in. apart longitudinally, and inside them were laid three bars of the longitudinal reinforcement, the diameter of these bars being  $\frac{3}{4}$  in. Next came a layer of concrete sufficient to cover the bars, and over this were laid three  $1\frac{1}{4}$  in. bars, bent up towards the ends, so as to provide suitably for resisting tensile stress developed in the upper part of the beam section, between the supports and the points of contrary flexure. More concrete was then deposited, entirely covering the bent bars, and three  $1\frac{1}{4}$  in. diameter bars were laid over it. The upper stirrups were next adjusted over the top bars and pushed down into the wet concrete, these stirrups being made of 13 S.W.G. steel strip  $1\frac{1}{4}$  in. wide. The total length of metal in each stirrup was 19 in., giving an effective depth of about 8 in. The mould was finally filled up with concrete, and a period of four or five days was allowed for hardening before the addition of the floor slab.

A very similar course of procedure was followed in the construction of the secondary beams, which contain six bars of longitudinal reinforcement, four bars of  $1\frac{1}{4}$  in. diameter near the bottom of the concrete, and two bars of  $\frac{3}{4}$  in. diameter near the top.

The ends of all the bars and stirrups were split and bent out, so as to afford secure anchorage, and the round bars were joined together at places where they overlapped, the extent of the overlap varying according to the strain coming upon the construction.

After the concrete of the main and secondary beams had sufficiently set, a 1 in. layer of concrete was spread over the centring, and upon this the first series of rods of the reinforcement for the floor slab was laid out. A second 1 in. layer of concrete was spread over the rods, and the second set was then laid out, 6 in. apart, transversely to the first set.

Concrete was next deposited to the thickness of 2 in., in three strips, one 24 in. wide midway between and parallel with two adjacent joists, and one 12 in. wide next to each of the side joists of each floor panel. Thus, in each span of 8 ft. between the joists there were three ridges and two hollows over which the third series of rods was laid, 6 in. apart, each rod being bent to fit the contour of the concrete.

The hollows were next filled up, and enough concrete was added to cover the raised parts of the rods, the material being thoroughly stamped down. After this operation the fourth and last series of rods was laid at right angles to those previously fixed. A final layer of concrete was added, and after being rammed and levelled made the slab 5 in. thick. As the work progressed the projecting ends of the beam stirrups became incorporated in the floor slab, which, extending continuously over the beams and joists, thereby increased the total depth of those members to 23 in. and 19 in. respectively. In every case the rods laid in the floor slab overlap their supports by at least 6 in., and the ends are bent over to secure good anchorage.

All the walls of the sheds are built entirely of concrete-steel, and, as they carry no load whatever, it was not necessary to make them more than 4 in. thick.

The method adopted in building the walls was to erect a network of thin steel rods between adjacent columns at the ends and back of each shed, and then to fill in concrete by the aid of suitable moulds, built up of boards as the work proceeded.

A balcony at the north front of each shed is carried by concrete-steel cantilevers with a cast iron nosing, so as to prevent injury by the accidental contact of goods being hoisted or lowered.

The new sheds at Manchester Docks are built entirely of concrete-steel on the Hennebique system, the general designs having been prepared by Mr. W. H. Hunter, M.Inst.C.E., chief engineer to the Manchester Ship Canal,

and the details of construction by Mr. L. G. Mouchel, representing the patentee in this country. The building contractors were Messrs. Lovatt and Brueder, of Wolverhampton.

**The Gennevilliers Gasworks, Paris.**—Near the bank of the Seine on the northern boundary of the plain of Gennevilliers a large establishment has recently been built by the Societe d'Eclairage, Chauffage et Force-Motrice de Gennevilliers, including gas-producing plant, gasometers, storehouses for coal and other materials, a coal wharf on the river front, and a concrete-steel viaduct carrying railway lines for the transportation of coal to the storage depots. In the present paper the author deals chiefly with the construction of two concrete-steel storehouses on the Coignet system of reinforced concrete, which was selected after due consideration by M. Stinville, the engineer by whom the general plans of the buildings were prepared.

The building is 45 metres long by 28 metres wide, and comprises two floors and a flat roof, the first floor being 4.40 metres above ground level. It should be noted that although the outer walls are of brick, a very large proportion of the total weight of the structure is carried by concrete-steel columns, and transmitted by them directly to the foundations.

The entire building is supported by 80 columns of five different types. Each column is supported on a cast iron baseplate, and this in turn by a concrete pier of cylindrical form.

The reason for the arrangement of the columns in the manner indicated is to provide support for beams carrying a series of eight storage tanks, each measuring 9.44 metres square by 1.50 metres deep and weighing 140 metric tons.

Although far smaller than the Manchester Transit Sheds already described, the two storehouses at Gennevilliers are interesting examples of reinforced concrete construction, and the fact that they were completely built in the short time of four months by unskilled labourers under the direction of two foremen is one more proof of the advantages offered by concrete-steel for structural work.

**New Bridge Street Goods Station and Waterworks, Newcastle-on-Tyne.**—This building, now nearing completion, constitutes the most impressive demonstration hitherto available of the advantages of reinforced concrete construction to railway companies, one of its most noteworthy features being the exceedingly heavy loads carried by the columns and floor systems. The magnitude of these may be realised by the statement that, in addition to the dead load, the main floor is designed to carry the moving load of six goods trains, and to withstand the vibration stresses due to the working of heavy cranes, turntables, and other machinery.

The new building is situated at New Bridge-street, near the former terminus of the Blyth and Tyne Railway Company, now merged in the North Eastern system.

In addition to station accommodation, provision is made on a large scale for warehousing general merchandise and for the storage of floor. The main dimensions of the building are 430 ft. long by 178 ft. 4 in. wide by 83 ft. 4 in. high from the basement floor to the top of the parapet.

The basement is designed for use as a low-level goods station, with four tracks for trains and ample space for dealing with inward and outward goods. On the ground floor, designed as a high-level goods station, there are six sidings into which trains will be run, and powerful hoists (H.H.) are installed to provide for the transference of trucks from one level to the other. For dealing with merchandise there are provided in the basement two electric cranes revolving around pillars, and two overhead revolving and travelling electric cranes. On the ground floor, there are two radial electric wall cranes, two overhead revolving and travelling cranes, as well as turntables and capstans for the manipulation of wagons.

The equipment includes other ingenious types of electrically-operated apparatus for the economical handling of material.

The upper floors are intended for storage purposes, and the flat roof is available for crates and packages not requiring protection from the weather.

A portion of each upper storey is prepared with inclined floors for the reception of floor.

The floor storage is capable of holding 2,100 tons, or 16,800 twenty stone sacks.

The floor spans in the upper stories are reduced to 14 ft. 11 in. from centre to centre by the small columns which are carried on the main longitudinal girders of the first floor. These girders are supported in turn by the arched transverse beams, and vary in dimensions according to position, some of them projecting 2 ft. 0 in. and others 3 ft. 3 in. below the under surface of the floor slab, the width varying between 15 inches and 18 inches. The intermediate longi-

tudinal girders shown in the section are 12 in. wide, and project 2 ft. 3 in. below the floor slab.

One of the most interesting structural features is the series of arched beams spanning the distance of nearly 180 ft. from wall to wall, with the intermediate support of three columns. Similar beams extend across the building at regular intervals of 33 ft. centre to centre. The two outer spans of each series measure 37 ft. 2 in. between the centre lines of the supports, and the two inner spans 52 ft. from centre to centre. The girders measure 1 ft. 6 in. wide, 9 ft. deep at the springings, and 3 ft. deep at the crown. These are by far the longest span concrete-steel girders ever built in this country, and they have only been surpassed in a few isolated instances in other parts of the world. The test load specified for the girders was 400 tons, but at the time of writing the official tests have not yet been made.

The ground floor is carried entirely by reinforced concrete columns, and includes three spans measuring 35 ft. 3 in., 24 ft. 3 in., and 27 ft. 0 in. respectively on either side of the major axis of the building.

The wall columns rest upon massive foundations of concrete, which also serves the purpose of retaining walls, and their inner faces form the side and end walls of the low-level station. The interior columns in each transverse row terminate in bases of triangular elevation, one in the centre being 15 ft. 6 in. square, the two small bases on each side of this 7 ft. square and the two outer bases 14 ft. square in plan. The columns supported by these bases have cross sections in the low-level station of 3 ft. 4 in., 1 ft. 6 in., and 2 ft. respectively. In the high-level station the three columns which are continued upward for the support of the arched girders, previously described, have the uniform cross section of 2 ft. square, with capitals for the support of longitudinal beams, upon which are fixed rails forming tracks for the travelling cranes.

In the floor system immediately above the low-level station, the transverse girders, spaced 33 ft. apart centre to centre, are 1 ft. 6 in. wide by 2 ft. 9 in. deep, two portions of the girders on the inner side of the outermost row of columns being raised so as to form platforms for handling merchandise. The longitudinal girders of the same floor system are 1 ft. wide by 2 ft. 3 in. deep, and the spacing varies according to the requirements of the spans. These girders are monolithic with the columns, and the whole system is connected by a floor slab 9 in. thick, forming a compression flange common to the network of beams. Upon, and partly embedded in the slab, are sleepers carrying the various rail tracks, and the floor surface of the high-level station is formed by a layer of concrete 6 in. thick.

Owing to the necessity for adopting long spans, to avoid interference with the conduct of traffic in the station, the loads coming upon the columns are exceptionally heavy. This will be realised clearly when it is stated that the ground floor was calculated for a dead load of 336 lbs. per square foot, in addition to the moving load of railway traffic. As each loaded wagon may represent a dead weight of more than 42 tons, the total weight on the floor will be very large, and the dynamic effect of moving trains, the handling of heavy merchandise, and the operation of machinery will add very considerably to the strains to be resisted.

In March, 1905, two panels of the floor were tested under the supervision of the architect. The first was one of the panels over the beam, and the second one of those over the second beam, the dimensions from centre to centre of the supports being 27 ft. 9 in. by 50 ft. and 35 ft. 3 in. by 50 ft. respectively.

On the basis of 336 lb. per square foot, the test load for the 27 ft. 9 in. span was equal to 460,000 lbs., but, as a matter of fact, the specified weight was exceeded by 45,000 lbs., the total weight applied being 505,000 lbs., or nearly 370 lbs. per square foot. In spite of this, the maximum deflection at the centre of the supporting beam was only 0.835 in.

In the case of the 35 ft. 2 in. span, the specified test load was about 573,000 lbs., an amount that was exceeded in the official trial by 37,000 lbs., equivalent to a total load of 610,000 lbs., or nearly 360 lbs. per square foot. Nevertheless, the maximum deflection of the beam at the centre was only 0.312 in.

The measuring instruments employed for the purpose of registering the deflection during the loading and unloading of the floor panels indicated that the beams began to return to their original form as soon as unloading was commenced, thus demonstrating the positive elasticity of the construction.

The station and warehouse here briefly described was designed by and erected under the superintendence of Mr. W. Bell, F.R.I.B.A., the architect to the North Eastern Railway Company. The entire building is of reinforced concrete, and was constructed in accordance with the Hennebique patents.



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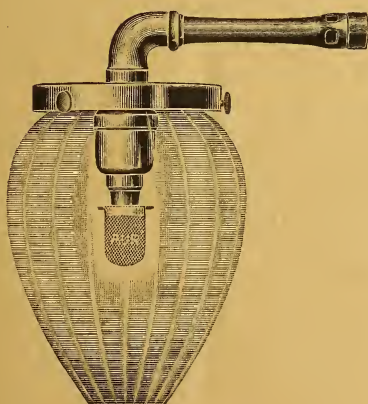
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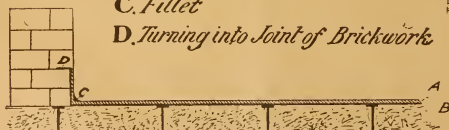
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**Water Tower or Reservoir at Newton-le-Willows.**—Among the varied applications of reinforced concrete, there is none in which the material can be more usefully employed than in the construction of storage reservoirs of different types suitable for the requirements of small districts and of industrial establishments.

This work forms part of a scheme prepared for the Urban District Council by Messrs. Read and Waring, of Westminster, and receives water from the adjacent pumping station drawing supplies from a deep well. When preparing the details of the general project the engineers had before them two alternatives—the construction of an ordinary service reservoir on elevated land at a distance of some two miles, or the erection of an elevated reservoir close to the source of supply.

The second alternative presented very evident advantages, the cost of constructing a reinforced concrete reservoir was found to be less than for a covered reservoir of the ordinary type, plus the cost of a pumping main; in the second place, by building the reservoir close to the pumping station there would be a considerable saving in the first cost and up-keep of service mains, a proportionate reduction in the power of the pumping engines, and, by avoiding the necessity for two separate stations, an important reduction in establishment charges.

Of course, the elevated reservoir might have been built of cast iron or steel erected upon a brick tower, but apart from the well known objections to metal tanks of large size, the cost would have been far above that of reinforced concrete, a material that lends itself to economical construction, and, being unaffected by the corrosive action of air and water, is particularly suitable for the storage of water.

The tower includes a circular reservoir with an internal diameter of 72 ft. and a water depth of 12 ft., giving a capacity of 300,000 gallons. This reservoir is supported on twenty-eight columns. The four inner columns form the corners of a shaft which accommodates the inlet and outlet pipes, and contains a cast iron circular staircase for access to the valve chamber and top of the tank. The remaining columns form two rings, and are connected by radial and circumferential beams of monolithic concrete-steel construction.

The reservoir proper is built with walls of concrete 6 in. thick, reinforced by steel rods suitably placed for resisting the stresses due to outward pressure. The floor is formed by radial beams 7 in. wide by 15 in. deep and two ring beams 10 in. wide by 19 in. deep, supporting a monolithic floor of concrete-steel 5 in. thick, the beams and slab being reinforced in the manner characterising the Hennebique system. In addition the floor is further supported by a ring of arches 10 in. wide connecting the outermost series of columns, and by corbelling with a projection of 2 ft. 6 in. and a depth of 6 ft. 6 in., the corners of the reservoir being thickened to form a plinth of triangular section with a depth of 1 ft. 3 in. The roof consists of a concrete-steel slab, 4 in. thick, supported on pillars and radial beams measuring 5 in. wide by 9 in. deep, an inner ring beam 7 in. wide by 10 in. deep connected with the central, lower, and second ring beam, 8 in. wide by 11 in. deep, and a cornice virtually constituting a ring beam projecting 5 in. from the wall and 9 in. from the roof slab. This cornice is carried up above the roof to provide for the bed of sand (intended to protect the reservoir top from the direct rays of the sun), and also forms part of the parapet, rising to the height of 5 ft. 6 in. above the surface of the sand. Intermediate support for the roof of the reservoir is afforded by an interior ring of columns, 8 in. square.

The foundations of the four columns at the corners of the central tower are 6 ft. square, those of the intermediate columns 7 ft. square, and those of the outer ring 6 ft. square. All these foundations are 2 ft. 6 in. deep, and the bottom surfaces are about 10 ft. below ground level on solid sandstone rock. At ground level the columns are 3 ft. square in cross section and above the first tier of horizontal beams, they have parallel sides and a cross section of 1 ft. 9 in. square, the radial beams between ground level and the under side of the reservoir proper measure 12 in. wide by 15 in. deep, and the ring beams are of different dimensions on the different tiers and in each ring, as indicated in the sectional elevation.

The central tower passing through the tank rises to a height of 107 ft. above ground level, and provides accommodation for the delivery and service mains, and for a stairway leading to the valve chamber above the reservoir.

The construction was commenced in July, 1904, and completed in October, 1905, when the tank was filled with water, the contractors being Messrs. W. Cubitt and Co., of London.

This is by far the largest reservoir of the kind hitherto built in this country, having twenty times the capacity of the similar structure which has been in use for five years at Bournemouth.

**Church of St. Jean de Montmartre. Paris.**—The church of St. Jean de Montmartre is a remarkable example of reinforced construction, and, so far as concerns boldness of design, it probably has never been surpassed.

The height of the outer walls is 35 metres (nearly 115 ft.), and the reinforced brickwork of which they are built is only 4½ in. thick.

The building comprises two stories, one being the crypt, 32.8 ft. high, and the other the church proper, 82 ft. high to the top of the walls. Support for the entire structure is provided by cylinder foundations, on which are built reinforced brick columns, 1 ft. 5 in. square, with a central core of concrete. The columns are carried up through the crypt for the support of the church roof, and below the level of the upper floor they are provided with arched ribs, which form a vaulted roof to the crypt. In the church there are galleries and a balcony supported also by ribs springing from the columns.

The roof of the church is a system of domes formed of curved ribs of reinforced brick, with connecting layers of concrete, the whole reinforced with a reticulated system of steel bars.

The walls are so reinforced in every part, and so connected with the columns, floors, and roof that they are able to span considerable openings without intermediate piers or girders.

These are the main features of the church, which, owing to the exceedingly daring character of its design, has somewhat undeservedly been designated as *la folie du siècle*.

Referring briefly to one or two details of construction, it may be mentioned that near the top of the foundation cylinders a triangulated system of reinforced ribs was built from cylinder to cylinder, and that the reinforcing bars of these cylinders were connected with a network of steel extending over all the ribs and embedded in a layer of cement mortar, forming a continuous floor slab for the crypt.

As will be gathered from the description, the construction, as a whole, constitutes an interesting study, and although members of this Association may not be anxious to emulate the example here considered, they may learn from this building how great is the adaptability of reinforced construction, and how useful is the aid it offers to those who are bold enough to break away from stereotyped methods.

**The Guillec Viaduct and the Pougastel Bridge.**—These examples are taken together, because they both represent the Armocrete system, which, so far as compression members are concerned, is based upon the variety of reinforced concrete devised by M. Considère, Inspecteur-General des Ponts et Chaussées, and described by him as *beton fretté*, or hooped concrete.

Briefly stated, the essential principle underlying this method of reinforcement is that a spiral winding of steel, about a core of concrete, is placed in tension by the lateral swelling of concrete under compression, and as the ratio of lateral expansion to longitudinal shortening is about as 1 : 2.4, less strain comes upon the reinforcement used in this way than in the form of longitudinal bars for resisting direct compression. In point of fact, M. Considère's exhaustive experiments show that 1 lb. of steel used as a spiral winding possesses the same value as 2.4 lb. of the same material used as longitudinal reinforcement. At the same time, it should be pointed out that the resistance of the spirals to flexure is small, and that for this reason they should be supplemented by longitudinal bars in all compression members.

The Guillec Viaduct, the construction of which the author is informed will be commenced this year, in the Department of Finistère, France, includes eight bowstring spans of 55 ft. 9 in. each, supported on light latticed piers of hooped concrete, the lower ends of which are wedge-shaped with the object of permitting the piers to swing to the right or the left as the main spans expand and contract under the influence of temperature variations.

The author also dealt with the Pougastel Bridge, the construction of which is also to be commenced this year in the same Department of Finistère. The most striking features of this bridge are the employment of hooped concrete bowstring girders, with a span of 317 ft. 9 in., and the manner in which the method of bracing usual in steel girder design has been applied to reinforced concrete.

In each of these designs all the tension members are reinforced in the ordinary way, and the compression members in accordance with the Considère system.

A bridge embodying the same principles is now being built at Avranches, in Brittany, in which three types of construction are represented:—(1) A bowstring girder span of 72 ft.; (2) two parallel latticed girder spans of 34 ft.; and (3) an arch span of 115 ft. 6 in., the total length of the bridge being 256 ft. between abutments.

**The Renommée Hall, Liège.**—In the design of this fine building one great object of the architect was to avoid the employment of concrete merely as imitation stone, and to



adopt a design indicating the characteristics and utilising the properties of concrete-steel to the best possible advantage.

The building is about 280 ft. long by 93 ft. wide. The principal hall measures 154 ft. long by 93 ft. wide, the main span being 55 ft. wide. It is covered by three cupolas, each 55 ft. in diameter, commencing at a height of 50 ft. above ground level.

Each cupola forms part of a sphere, which is continued in haunches pierced with lights and descending to the corners of a circumscribed square. The intersections of the spheres, with the vertical planes passing through the sides of the squares, are formed by arched ribs which spring from the capitals of short cylindrical columns. The cupolas are  $4\frac{1}{2}$  inches thick, and are made of clinker concrete reinforced with expanded metal and a latticed arrangement of steel bars.

The hall was designed by M. Paul Jaspar, of Liege, and built by the firm of Perraud et Dumas, Brussels.

**Locomotive Depot at Renes, Switzerland.**—A novel application of concrete-steel is to be found in the locomotive depot built in 1903 at Renes, on the system of the Jura-Simplon Railway Co., near Lausanne.

The most recent designs of locomotive sheds are to be found in Great Britain, where, curiously enough, a return has been made to the employment of timber framework, this development at first sight appearing of retrograde character. On consideration, however, it must be recognised that there is some justification for the abandonment of metal work, which, owing to oxidation and injury due to the sulphurous fumes contained in smoke emitted from locomotives, is so rapidly corroded as to involve heavy maintenance charges. On the other hand, the products of combustion tend rather to preserve timber, and to impart to it in some measure the quality of non-flammability.

With regard to the Renes depot, it should be mentioned that Professor Bosset, the engineer consulted by the Jura-Simplon Company, reported in favour of the British type of design, but with the reservation that all parts of the structure usually built of timber should be constructed in concrete-steel.

In the designs prepared by Professor Bosset reinforced concrete is exclusively employed for the roof proper, for the hoods required for collecting smoke from locomotives, and for the vertical flues for the discharge of smoke into the outer air.

The roof proper consists of a series of beams supported by columns of concrete-steel. Except where lanterns occur the roof is flat, being composed of a concrete-steel slab.

The hoods formed by plates of concrete-steel 35 millimetres thick. The vertical flues, also of concrete-steel, are circular in cross section, with an internal diameter of 75 centimetres, the wall of the flue being 35 millimetres thick. Each flue is fixed in a socket of concrete-steel, moulded upon, and monolithic with, the roof slab. Thus, the smoke hoods and flues are free to slide within the sleeve joint, a condition very necessary for the avoidance of undue strain upon the concrete.

French engineers have taken much interest in the system of construction here described, and the author believes it to be thoroughly worthy of consideration by railway engineers in this country.

The two preceding examples of construction possess special interest in view of the attention which has been drawn so much of late to the effects of corrosion upon the iron and steel roofs of railway stations and other buildings.

The roof of the Renommée Hall demonstrates in a striking manner the light and elegant character of the construction rendered possible by the combination of concrete and steel. A roof designed on similar principles for a railway station would lend itself quite as well as a steel structure to efficient lighting, and the span could be further increased it though desirable for the purpose of reducing the number of transverse intermediate supports in a large terminus. Concrete-steel would obviously be equally applicable to any other type of station design, and the fact that roof principals of more than 100 ft. span have been built in America is sufficient to show that the material is applicable for the purpose here suggested.

In conclusion, the warning may be given to those who contemplate the employment of reinforced concrete, that in addition to the necessity for correct design, it is most essential that all the materials for the preparation of concrete to be used in combination with steel must be carefully selected and mixed in proper proportions and in approved manner; and that the arrangement of the reinforcement in the moulds and the subsequent deposition and tamping of the concrete must be performed under thoroughly competent superintendence. Neglect of these points is almost certain to result in unreliable work, and therefore to prejudice the new material in the eyes of professional men and the public alike.

## OUR SOUTHERN LETTER.

(FROM OUR OWN CORRESPONDENT.)

### Railways.

Interest still runs high in connection with the schemes for the Cork Junction Railways. The three Bills have passed the Standing Orders of the House of Commons, and the Bills have been reported for first reading as soon as Parliament meets. The Bill for the Cork and Fermoy scheme has been withdrawn, so will not be proceeded with.

The County Council have held a special meeting at which they considered the position they should adopt towards the three schemes. They decided that to protect their interests by lodging petitions against the three schemes, so that they could, before any one of the Bills were passed, consider what would be the best form in which to deal with the linking of the railways, and that they could also consider the question of guarantee.

The question of estimates is always a difficult matter to deal with, especially when it is desirable to draw a fair comparison between different schemes. In the local Press there has been some correspondence dealing with the relative cost of the schemes.

The solicitor of the Cork City Railways gives the following:—The figures taken from the Parliamentary estimates, deposited in Parliament, are:—

The Cork and Waterford Railways (including Youghal and Cappagh Line) .....	£595,851
The Cork City Railways .....	98,419
The Cork Link Railways .....	180,000

One of the engineers to the Cork Link Railways does not approve of these figures, and states that in the Cork City Railways that the total sum allowed for land and buildings is £23,150, which he considers insufficient, but he does take notice of the fact that even if this sum were doubled it would still leave a substantial margin between the cost of the two schemes.

Instead, he goes one better, and states he considers that by the time the Cork City Railways are completed they will have cost £225,000, which, he states, is the amount of capital they seek powers to create. This has been contradicted by one of the promoters, who states the amount of capital is put down at £150,000, which would still point to the second scheme as being the cheapest, which it should be, as the third scheme includes a high and low level system and double decker bridges.

### Waterworks, etc.

The competitive examination of candidates for the vacant post or resident mechanical engineer at the Cork Waterworks was duly held. There were thirty-six candidates. The decision of the examiners placed A. T. Quelch, 66 Bromfield-road, Clapham, London, first, with 88 per cent. of marks; R. P. Adams, 180 Aldersgate, London, second, with 67 per cent. of marks; and M. Riordan, St. Ann's Villas, Ringskiddy, Cork, third, with 62 per cent. The Corporation unanimously elected the third candidate on the list, M. Riordan.

The Fermoy Rural District Council having advertised for tenders for the construction of a water supply works for Conna in accordance with plans and specifications prepared by Mr. J. P. Punch, B.E., received five tenders, varying from £649 to £1,067 17s. 6d. They decided to accept the lowest, which was sent in by Mr. Denis Creedon, contractor, Fermoy.

The Macroom Urban Council have received tenders for the construction of sewerage works for Macroom, in accordance with the plans and specification prepared by their engineer, Mr. A. W. Barnard. The tenders varied from £1,020 17s. 6d. to £1,700. They decided to accept the lowest, which was sent in by Mr. Daniel Collins, contractor, Castletownbere.

Messrs. Kaye-Parry and Ross, engineers, have submitted the plans and specification for the purification of the sewage of Mitchelstown, and placed the particulars before the Mitchelstown Rural District. The scheme will include a grit chamber, tank, and filters, outfall and intake sewers. In the filters it is proposed to use the Fiddian Patent Distributor, the effluent to be discharged into the river. The estimated cost of the works is £1,200.

The Cork Harbour Commissioners have decided to contribute the sum of £2,000 towards the cost of block paving portion of Penrose Quay, proposed to be carried out by the Corporation at an estimated cost of £4,000, and it was also decided that the engineers to both boards should confer together as to the best method of carrying out the works.

Mr. W. Kaye-Parry has been appointed architect for the new Kingstown municipal baths.

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## CORRESPONDENCE.

## APPOINTMENTS UNDER LOCAL AUTHORITIES.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—The able comments in your issue of January 27th touch a subject of particular interest alike to architects and their deputies. The architects, however, can speak for themselves, but take the case of a competent, well-trained clerk of works seeking employment on a District Council. The fact is, as a general rule, ability and training, either practical or technical, count for nothing. And why? Simply because of the freedom enjoyed by Councillors in not having their decision in such an important matter questioned or investigated by the ruling authorities.

It would seem incumbent on those whom it affects to ask the L.G.B. to interfere (it is assumed they have a *locus standi*), in so far at least as to refuse to sanction the appointment of a clerk of works who could not produce a testimonial (one should be enough) from an architect of repute, and thus put a stop to the imposture of installing non-technical men.

The existing practice is too general to be called blunder or mistake; 'tis farce, and it can be inferred that a standard of intelligence prevails on these Councils where such selections are governed by prejudice. Whenever a clerk of works is wanted he is suddenly discovered among the satellites of a Councillor and put forward and elected to the post, utterly regardless of qualification. The ratepayers don't object. Well, it may be asked, is it so much a question for the ratepayers as for the technical men? Besides a waste of public money it is denying a legitimate place to the man naturally entitled to it, a state of affairs obviously preposterous and in no sense economic. Why prate of Home Rule when such a question as this does not get logical attention.

It may be contended that there are degrees in capability to such extremes as to sometimes warrant the debarring of even a man of training, but that is beside the question. When a man wants apples he goes to an orchard, not to a potato garden, and he cannot be blamed if he finds inferior apples.

The kind of man above referred to may be a handy carpenter or mason, with a *very* local reputation, and he can usually produce a batch of testimonials, sometimes bearing the signature of a clergyman or "squireen," for whom he has at one time perhaps mended a broken arm-chair or coped a roadside wall, or it may be that he has assisted in the necessary mutilation of an antiquated orchard.

The writer has met with such creatures "in charge" of works by no means of a simple character, and their innocence of all going on about them was refreshing, not to say pathetic. A man of this class proves, in spite of himself, to be a pest, and the truth of this can be seen by anyone who understands building operations.

Their adventures among plans and specifications are no less amusing, and those of their own production are a very strong argument in favour of interference by the architectural profession to restrain such quackery by the strong arm of the law.

Their draughtsmanship is usually of the black and white order, a method adopted more from compulsion than from choice, but perhaps with the view that "he who runs may read." In any case, he who cannot read ought to run. It is said that Napoleon once from his camp in Germany sent a cordial note to Josephine, which she mistook for a rough map of the seat of war. The "phantom views" of your Council-made architect are quite as perplexing, but he does not, however, appear so well entitled to his joke as "old Boney."

In the writer's opinion the position is one that should be attacked by those whom it most affects, and as the architects, broadly speaking, control the greater part of the building work of the country, a great deal could be done by them if, apart from any legislative interference, they discountenance the engagement of incapable deputies, a right which they would be perfectly justified in exercising. Plenty of excellent men are known to architects and engineers, and it is only reasonable to expect that they should be encouraged and to some extent cultivated. Every architect of experience knows full well the importance and value of careful and efficient superintendence of building work, and will admit that the critical eye of the overseer is as deserving of remuneration as the skillful hand of the craftsman. It is only within limits after all that the impostor can operate, and there should not be much difficulty in relegating him to his place.

Now, as regards contractors, there is hardly perhaps any business which has so many adventurers, with the result that the standard of work is being lowered, notwithstanding any zeal or vigilance which an overseer may exercise. The

"lowest tender" system is largely to blame for this. Reference is not made to builders who understand their business and can compete to a nicety in prices, but to those jobbers in town and country who "chance their arm," even at the risk of losing money. When they find they have made a mistake every manner of dodge is resorted to to save their pockets, and their ingenuity in this line is inexhaustible—another instance of how necessity becomes the mother of invention. Some of these could not superintend the laying of an agricultural drain, and their ignorance of even simple building construction is only equalled by their capacity for quibbling, fortified by the bluff manners of a confident auctioneer. Contractors, as a class, have a notorious reputation for dishonesty, but it is a case where the innocent suffer for the guilty should a venture prove successful. A keen sense of profit and loss develops, 'but knowledge of building work . . . that is but a detail!'

It will be said, "Why not hold him to his contract?" Easier said than done; but it can be done too, in a sense at least. This is not all, however, for a contract may be fulfilled "within the meaning of the Act," but are there not degrees in workmanship and finish; aye, degrees of the finest shades to a critical eye, and what a difference between the extremes, the loveliest class of work usually following the lowest tender. This is where the good contractor comes in, and yet people are so short-sighted as to think they save money. But the public cannot be expected to see the position in its true light.

It would not be too much to expect architects and engineers to use their influence in "cutting out" such incapables, either by refusing to agree to their engagement or by exacting work of such a kind, irrespective of stipulated price, as would teach a contractor the true value of it in the hope that he may retire after one or two experiments.—Yours, etc.,  
1st February, 1906. FREE LANCE.

## OUR ILLUSTRATIONS.

## Modern Domestic Work in Germany.

Our correspondent, Herr Willy Bock, 71 Hohenzollern Strasse, Coblenz, Germany, sends us four photographs of recently completed works of his in and around the beautiful town of Coblenz. Herr Bock's name is well known as one of the ablest of the younger and more advanced school of German architects; and he has been prominently identified with the progress of *l'art nouveau* there.

Some twenty-five years ago architecture, both ecclesiastical and domestic, was at a very low ebb in that country. The bulk of the domestic work was executed in stucco. The use of brick and stone in exposed faces was scarce, and confined to great public buildings. In later years the younger school of architects have introduced quite a style of their own, and effected a great revolution. Certainly this style lacks nothing in originality, though often more ornate and rich, than would appeal to the best English taste.

The works we illustrate are:—

- a. Villa Oswald, Coblenz.
- b. Villa Stochert, Vallengaer.
- c. Villa Kastenaun, Coblenz.
- d. Villa Kraf, Coblenz.

They are typical of good German villa work. There is scarcely a town of any importance in Germany in which villas of interest and importance are not almost daily springing into being—so greatly are the more important German centres increasing in population, wealth, and importance.

## THE REGISTRATION BILL AND THE GENERAL ELECTION.

## A Postcard Plebiscite.

In view of the re-introduction of The Society of Architects' Bill into Parliament early in the forthcoming session, the Council circularised every Parliamentary candidate, calling attention to the Bill, giving a brief synopsis of its scope and object, and inviting the candidate to record, by means of a prepaid postcard, his agreement or otherwise with the principle of a Statutory Qualification for Architects, and his intention, if elected, of supporting the Bill.

A letter was also sent to the members of the Society, asking them to support the Council's action by writing to their local Parliamentary candidates to a similar effect, and there are indications that this co-operative action had some good results.

We hope this brisk action on the part of the Society may have good effects by preparing the mind of the newly-elected members for the introduction of the Bill, which otherwise would be likely, in common with all matters relating to building or architecture, to be treated with contemptuous indifference.





## ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS

### Apology 1.

I must growl and beg forgiveness for not giving you any jottings for your last issue. You see, there are *two* press correspondents on the A.A.I. Committee, who have arranged to supply news from headquarters. I say it was *his* fault. He retaliates and states that it was my turn. Between us you suffer!

### News.

Well, anyway, *the* news is that the Head Cook and Bottle-washer has had an increase in his salary. If only he would learn to write!

### Museum.

A few matters of minor importance include the commencement of the fitting up of the museum, which is an indication that things are moving and that the *other* museum (the one in Kildare-street, you know) had better look to its laurels.

### Education.

The Education Movement has also been pushed on a stage—a very considerable stage, too. I am not referring now to the Education Bill which Mr. C.B. has got to tackle, but the one which the Association has tackled. The sub-Committee has laid a report before the General Committee, together with a most admirable scheme whereby sprouting architects may learn “all about it” in three years at the really very moderate rate of 4½ guineas a year. We are now trying to find out whether our rooms are large enough to accommodate the classes of prospective aspirants to knowledge.

### Oxygen.

Can 11 persons live comfortably in one room? Mr. Butler in his paper the other day stated he had found that number living in one room—I don't think he said they were particularly comfortable. Anyhow, I think that Mr. Butler, in his lecture, dealt with a subject and condition of things which should be very carefully considered by public bodies in Ireland, and I recommend to them the very careful perusal of his paper, which was published in a former issue.

### Apology II.

Mr. Editor, I won't do it again, but I feel giddy to-night.

## THE INSTITUTION OF CIVIL ENGINEERS AND EXAMINATIONS.

We have received a copy of the by-laws of Institution of the Civil Engineers of Ireland, as revised during the past year, authorised at a general meeting of members held in March, 1905.

We are glad to note that the Institution has finally adopted the principle of examination as the main condition precedent to election as a member or associate member. The following clauses, taken from the by-laws, set forth the qualifications necessary to be possessed by candidates for election to the class of member and associate member respectively:—

2. Members shall comprise every person who on the 15th day of March, 1905, was on the register as a member, and every person thereafter elected or transferred into the class of members. Every candidate for election or transfer into the class of members shall be more than twenty-five years of age, and shall come within one of the following conditions:—

(a) He shall have been regularly educated as a civil or mechanical engineer; shall have had subsequent employment

for at least five years, and shall be actually engaged at the time of his application for election or transfer in responsible situation as resident engineer, or otherwise, in some of the branches constituting the profession of a civil or mechanical engineer; or,

(b) He shall have practised on his own account in the profession of a civil or mechanical engineer for at least seven years, and shall have acquired a considerable degree of eminence in the same.

3. Associate members shall comprise every person who, being a civil or mechanical engineer by profession (evidence of which must be afforded to the Council, whose decision regarding same shall be final), was on the register as an associate on the 29th day of March, 1899, and every person thereafter elected into the class of associate members.

Every candidate for election into the class of associate members shall be more than twenty-one years of age, and he shall come within one of the following conditions:—

(a) He shall have been regularly educated as a civil or mechanical engineer; shall have passed such examination or examinations as are appointed, or are recognised by the Council, and shall be actually engaged at the time of his application for election in the design or construction of such works as are comprised within the professions of civil or mechanical engineers; or,

(b) He shall satisfy the Council that he had a sufficient training, that he has been engaged for at least five years, and that he is actually engaged at the time of his application for election in the design or in the construction of such works as are comprised within the profession of a civil or mechanical engineer, and shall furnish a satisfactory thesis or paper on a professional subject; or,

(c) He shall, whilst complying with either of the foregoing conditions as to training and occupation, as set forth in “a” and “b,” afford satisfactory proof to the Council of his fitness for election without either examination or the submission of a thesis or paper.

4. Associates entitled to the privileges of corporate membership shall comprise every person who, not being a civil or mechanical engineer by profession, was on the register as an associate on the 29th day of March, 1899.

## IMPORTS.

### PORT OF DUBLIN.

January 24th, per Lady Wolseley, from London, 42 packages lead, S. Boyd.

January 26th, per City of Belfast, from Ghent, 2,034 bags cement, to order; per Thetma, from Göteborg, 32 cases glass, 3 bags wood, 2,500 bundles laths, 291 pieces deals, 2,585 pieces battens, 14,262 pieces planed boards, to order.

January 27, per Essonite, from London, 300 tons cement, Dublin Cartage Company.

January 29, per Bengore Head, from St. John's, N.B., 21,075 pieces firwood (sawn); 2,866 pieces deals, to order; per City of Hamburg, from Antwerp, 57 cases window glass, W. Martin, Son, and Co.; 261 steel joists, to order; 33 steel plates, do.; 11,442 iron bars and angles, do.; 37 packages tiles, do.; 34 cases marble, do.; 5 cases plate glass, do.; 90 cases window glass, H. Sibthorpe and Son; 30 do., do., to order; 2 do., do., Hoyte and Son; 40 do., do., Brooks, Thomas, and Co., Ltd.; 10 do., do., Combridge; 25 do., do., T. and C. Martin, Ltd.; 118 do., do., T. Dockrell, Sons, and Co.; per Marian, from Bridgwater, 20 tons bricks, J. Kelly and Son; 44 tons bricks, E. H. Tickell; 20 tons bricks, Monsell, Mitchell, and Co., Ltd.; per Emily Warbrick, from Rochester, 275 tons cement, A. Agnew.

January 30th, per Juno, from Norrköping, 33,383 pieces deals and battens, W. and L. Crowe, Ltd.

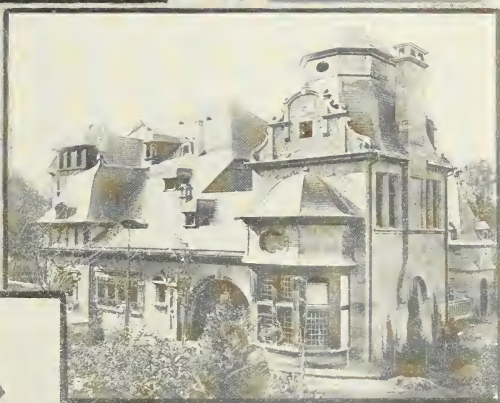
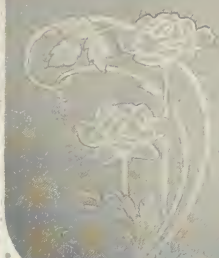
January 31st, per Harrier, from Gloucester, 180 tons bricks, etc., Alliance Gas Co.; per Gipsey, from Glasgow, 110 tons fireclay goods, T. Archer; per Lady Martin, from London, 600 sacks cement, Wallace Bros., Ltd.; 200 sacks whiting, T. Dockrell, Sons, and Co.; 20 firkins lead, do., do.

February 1st, per Result, from Connah's Quay, 180 tons bricks, T. & C. Martin, Ltd.; per Hurricane, from Rochester, 280 tons cement, T. E. O'Meara.

February 2nd, per Lord Roberts, from New Orleans, 315 bundles oak lumber, to order; 2,435 pieces pine timber, do.

February 5th, per Giralda, from Lanovig, 103,367 pieces planed boards, 15,340 pieces battens, W. and L. Crowe, Ltd.; per Lady Wolseley, from London, 700 sacks cement, F. Keegan; 93 sacks lead, H. Moore and Alexander, Ltd.

February 6th, per City of Stockholm, from Rotterdam, 3 cases window glass, to order; per Dinorwic, from London, 270 tons cement, Wallace Brothers, Ltd.



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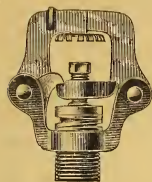
*Herr Willy Boch, Architect, Coblenz.*

- (A) Villa Oswald, Coblenz.  
(B) Villa Stochert, Vallengaard

- (C) Villa Kastenaun, Coblenz.  
(D) Villa Kraf, Coblenz.



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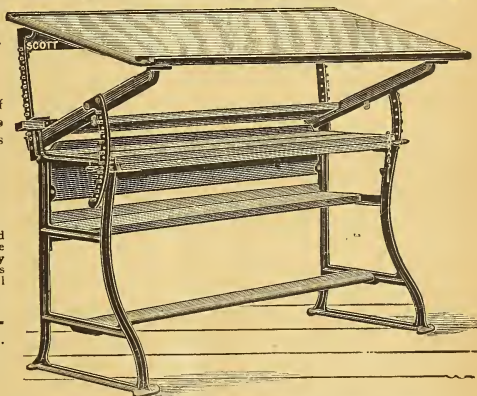
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FEBRUARY 10, 1906.

No. 3.

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## THE ART AND CRAFT OF PLASTERING.

It is but a very few years since we had the pleasure of reviewing the last edition of Mr. Millar's most admirable and comprehensive text book on "Plastering—Plain and Decorative";\* yet it has now run into a third edition—a result that we do not wonder at considering the superior excellence of this work, which has become the standard text book on the subject, and is amongst the best specialised technical works extant.

The present edition contains improvements and additions on the last, but alas, it possesses a melancholy interest, for while it was in the commencement of preparation, death laid his inexorable hand upon the hard-working author, and others had to complete the labour that to him was evidently one of love.

Mr. Millar was an example of a type of craftsman rare in these days. He was of the old school, yet far removed from the class of workers by "rule of thumb." Very often a trade—such as a plasterer—was followed by certain families generation after generation; and so it was with the Millars. There still remain in Ireland here and there representatives of this class. In days gone by these men, sometimes a father and several sons, travelled together all over the country following their trade; in Ireland they generally worked on the contract system, and were chiefly employed by the resident gentry, then a prosperous and also a cultured class, though occasionally

they followed the fortunes of some general contractor, a class then becoming common. We speak of fifty years ago or more. Things have vastly changed, the gentry are gone, or empoverished, and the main sources of employment for plasterers is in the towns; and in Ireland, at least, ornamental plastering is more or less a lost art, save in the hands of few men like Mr. John Ryan, of Abbey street, who still happily maintain the traditions of good craftsmanship, for which Dublin was once noted. The trades unions have more or less stamped out artists, and even good workmen in the plastering trade in Ireland; to such absurd lengths do they now go, that incredible as it may seem, it is nevertheless a fact that they actually will not allow their members to work for a master plasterer, but only for a builder and general contractor!

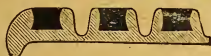
To return to Mr. Millar, he was, as we learn from the prefatory note to the book, himself a plasterer, and the descendant of a long line of plasterers, and the Editor of the work tells us that he found in him a craftsman who delighted in his craft. In his early days plastering had no text books or manual, and so he set himself to write this work—not, however, before he had himself first thoroughly mastered his trade; while doing so he steadily collected facts from all sources; he underwent the rare advantages of a rigorous apprenticeship, which the trades unions and the technical schools between them have now nearly supplanted. Mr. Millar worked in many parts of the United Kingdom, even extending his operations to Paris; he thus acquired a sound and diversified knowledge of the trade in all its branches. We are told that he extended this knowledge by well directed reading, by close observation, and by the trial and observation of new methods and materials, many of which he himself invented. In 1880 when engaged on his work, the labour of his life, there came ill-health, domestic and other afflictions, and to crown his misfortunes, a fire that robbed him of house and home, and all his treasured manuscript and drawings. With rare courage he at once set to work to replace that which he had lost, but even then ill-luck pursued him, for his publisher, after keeping the MS. many months in his hands without doing anything, failed. The late Mr. Batsford having undertaken to publish it, Mr. Millar revised it, and brought the matter thoroughly up to date prior to the publication of the first edition, as already related. Mr. Millar died before the publication of the present and third edition; in the hands of Mr. George J. Robinson, it has simply been revised for the Press. As it stands, the work is Mr. Millar's legacy to his own craft, and a monument to a strenuous life; and we doubt not that it will long remain a standard work of reference.

Of the book itself, space does not permit of our giving more than a brief outline of its principal heads. As the title indicates, it is, without being arbitrarily divided into two parts, devoted to the consideration of both plain and decorative work, and, appropriately enough, it opens with a short account of the history of plastering. Plastering, we are assured, is one of the earliest instances of man's inductive reasoning, for when men built they plastered, at first, like the birds and the beavers, with mud, but they soon found out a more lasting method, and the earliest efforts of civilisation were directed to plastering—at all events, it is evident that a knowledge of plastering was attained at a very early stage in the history of civilisation. The pyramids of Egypt contain plaster work 4,000 years old; in fact, the very tools remain, and in Dr. Petrie's collection at University College, London, there are such hand floats precisely similar to those still used. Fibrous plaster, too, was used by the Egyptians,

\* Plastering: Plain and Decorative. A practical treatise on the art and craft of plastering and modelling. By William Millar, Plasterer and Modeller. Fifty-five whole-page illustrations and 500 illustrations in the text. Third Edition, revised and enlarged. London: E. L. Batsford, 94 High Holborn. Price 18/- net, 1905.

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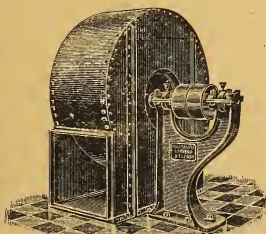
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who were also familiar with what is known as "plaster of Paris," and used it for all their finer work. Some of their plaster examined by Mr. Millar proved to be "three coat work,"  $\frac{3}{4}$  in. thick, and finished just as at the present day. Even reinforced concrete, now being so loudly trumpeted as a modern invention, seems to have been known to the Romans, for a speaker at a lecture the other evening at the Engineering and Scientific Association mentioned that

fibrous plaster, there has been a marked improvement in both respects.

Dublin was in the eighteenth century remarkable for the number and the extreme beauty of its finely modelled ceilings in the houses of the resident gentry. These ceilings, of which many still remain, were mainly the work of a colony of Italian artists, who were introduced into Ireland by the Lord Portarlington of the day, who, like



By G. Richardson, 1770.

Plaster Ceiling, Lord Montalt's Mansion, Dublin.

a certain Italian archaeologist had discovered slabs of concrete reinforced with bronze rods embedded therein. The historical sketch traces the history of plastering from ancient times, through the Middle Ages to the time of the renaissance, on to that bright era of plaster work, the Georgian period, when, in these countries at least, it seems to have reached its zenith, and rapidly began to deteriorate both in design and execution. Happily, however, of late years, especially since the re-introduction of

most of his contemporaries, was a cultured and travelled patron of the arts. Through the courtesy of Mr. Batsford we are enabled to reproduce one of the illustrations of a Dublin ceiling of the Adam period, depicted in Mr. Millar's book.

It represents the ceiling of the dressingroom in Lord Montalt's mansion in Dublin, and was executed in 1770. The room is 24 x 20 feet. The bas relief in the centre panel, representing Hercules and Omphale, was executed

by E. Robins, and the other ornaments were modelled by A. Collins. This beautiful ceiling was designed by G. Richardson, of whose nationality no indication is given us, but he was probably an Englishman, for about the same date he designed for Lord Scarsdale a very fine ceiling for the hall at Keddleston, Derbyshire, the seat of the Curzon family.

On the more practical side the work is even more exhaustive than we have indicated. The historical and artistic side, to every practical aspect of the detail of craftsmanship is dealt with in turn; even the latest processes connected with the craft is dealt with in a fashion only possible to a practical man of wide and ripe experience. Even such matters as patent plasters are described in detail. The various tools, materials, processes, and appliances are all treated of. Internal and external plaster and stucco work are exhaustively gone into, and there are likewise sections dealing with fire-resisting stairs and floors, paving, architectural dressings and reinforced concrete. Amongst the most useful features are descriptions of the methods of moulding and casing, and of the construction of the necessary moulds or forms, as, for example, for stucco columns. The illustrations are abundant, and the whole work is thoroughly well produced.

## COMMENTS.

### "A Thing of Beauty is a Joy for Ever."

"A thing of beauty is a joy for ever," and partly because she quoted Keats' elevated and elevating sentiment the unappreciative law declared Miss Lena Beatrice Clayton Browne to have been of unsound mind. Miss Browne was a young lady of position and means, a relative of Sir W. H. Hornby, M.P., resided at Windsor, and desired to be a pioneer of Art. Poor lady, her madness—so-called—took no more harmful form than the making of a will leaving £12,000 to be devoted to the beautifying of London by means of the erection of "an ornamental structure of Gothic design." That there was method in her madness—if mad she was—is evinced by her logical and right-minded directions as to the form this memorial should take. It was to be: "Of Gothic form, a market cross, a street refuge in market cross form, a tall clock, a street lamp, or all combined, were to be erected." No money was to be paid for the site. Miss Browne's name was not to appear on the erection. The outline was to be impressive when seen from afar. On the market cross, street refuge, etc., the following words were to be written: "Many and manifold are the gifts ministering to the flesh. Therefore is this structure dedicated to the more neglected gladdening of the eye. A thing of beauty is a joy for ever." The aesthetic testatrix had given further directions as to the structure. It was to be opened by the Royal Institute of Architects. There were to be "no masses of metal" on it. "No bronze or iron." Nor was there to be any "dead-white marble or alabaster." Such things "became toneless in our moist climate." However, there were to be "no pigments except on absolutely flat surfaces." But alas! Miss Browne's philistine, barbaric relatives opposed the will, and melancholy to relate, the Court sided with them, and for why? Because, forsooth, she railed against—and vehemently emphasised her railing—the ghastly horrors of the probably early Victorian horse hair sofas and arm chairs of her boarding-house, and evidence was given that at a boarding-house at Windsor she had torn up the carpets and cut to pieces the arm chair. She had insisted on eating her breakfast on the landing outside her bed-room. She tried to cut up the sofa. Once when she was staying at Pleasington Hall, the seat of her relative, Sir W. H. Hornby—it was the time of the smallpox epidemic—she proposed that she should be vaccinated on her back. "The Gothic structure is tottering," said the President, as he listened to the evidence.

A valued correspondent, who sends us the report of the trial, which took place in London, on 20th January, in the Probate Court, truly observes:

"See how unappreciative is the law (that undoubted 'hass'!) to all pioneers of Art. Poor Miss Clayton-Browne—all her artistic ideas seem to have been absolutely sound, but because, forsooth, she revolted against the horrible barbarity of the boarding-house sofa and attacked it with a vigour altogether admirable, she has been docketed for all time as 'of unsound mind.' In her protest against riveting masses of squirming bronze on to stone surfaces I am entirely with her. Alas! she is beyond the consolation of my sympathy."

It is a pity Miss Browne could not have carried out her ideas, so sound in Art and in love of beauty during life, if she, poor lady, were sane. Somebody once observed to King George that General Wolfe, the Victor of Quebec, had been mad. "Then if he was," retorted the King, "it is a pity he did not bite a few of my officers before he died." The pity is that Miss Browne, if of "unsound mind" by the law's dictum, could not have bitten the London County Council or other of our Civic Fathers.

### The Letchworth Exhibition of Cheap Cottages.

"The Field" thus describes the cottages awarded respectively first and second prizes (Mr. Percy Houlton, of Chesterfield, was the architect of the first):—While being of the simplest form outside, it is well proportioned and pleasing to the eye, the green woodwork of the large windows harmonising nicely with the cream of the rough cast which covers the gin. brick wall. But it is the interior which is most deserving of praise. It contains a living room, with range, the extreme measurements of which are 18 ft. by 12 ft.; there is a scullery with copper, 12 ft. 3 ins. by 7 ft. 6 in., and the three bedrooms measure respectively 18 ft. by 10 ft. 8 in., 12 ft. by 9 ft., and 8 ft. by 9½ in. by 8 ft. 8 in. There is a large larder, and coal place and w.c. in an outer lobby, which, thanks to the absence of doorway, is open to the air, and can be reached without going from under cover. The judges are satisfied that the building did not cost more than £150, excluding builder's profit, architect's fees, and haulage of material; items which, being variable, have in no case been considered in determining the value for cottages for prize-giving purposes. Per foot cube this cottage works out at 3½d. In one or two respects the judges suggest improvement, such as the bedroom windows being carried higher, a fireplace being put in the third bedroom, and a staircase window being made to open. The second prize in this class was awarded to what may be termed a composite cottage, for, while the walls exposed to most weather are of 9 in. brickwork, the rest of the outside walls are simply covered with weather boarding. The cost of this works out at 4½d. per cubic foot, as against 3½d. per cubic foot in the case of the first prize cottage, which was wholly of brick so far as the outside walls are concerned. In this cottage, of which Messrs. Bennett and Biddell, of Letchworth, are the architects, the living room, containing a range and dresser, measures 15 ft. by 12 ft., the kitchen is 12 ft. 9 in. by 8 ft. 9 in., and there are three bedrooms varying from 12 ft. 9 in. by 11 ft. to 9 ft. 5½ in. by 10 ft. 7 in. The general outside design is certainly more pleasing than that of the cottage winning the first prize. The third prize has been allotted to No. 35, a one-storey cottage built of concrete, by Messrs. Potter and Co. The outside walls are 7 in. thick, including the plaster and cement on the faces of the concrete; the inside walls are only 3 in. thick. We doubt if the judges have acted wisely in awarding a prize to this cottage, for, owing to the remarkable number of doors which open into the living-room, we consider it quite unsuitable for a labourer, or, indeed, anyone else, who has to use the living room to any great extent. Apart from this serious defect, the cottage has several excellent features.

None of these cottages would stand our climate, nor are they really suited to the needs of an agricultural labourer—9 in., 7 in., and 3 in. walls or weather boarding on a real soft day in the West of Ireland or on the slopes of "the Sugar Loaf" are simply impossible.

We have not had the opportunity of seeing the Letchworth Exhibition of cheap cottages; they have been widely



illustrated and described, but we do not consider that that Exhibition produced a single cottage that really solved the difficulty, or afforded an acceptable model. Many were of high architectural merit and artistic excellence, but the cheaper ones were all built of cheap, nasty, temporary materials, pretty to the eye, perhaps—but fancy the Macroom or some other big Southern District Council with 600 of these structures to look after! Why, they would want a small army of architects and workmen to keep them in repair, with constant outlay. The more substantial structures were more suitable for week-end bungalows, than for labourers' cottages, and their cost is consequently excessive. Besides this their ground space was wasted to a great extent in sculleries and pantries of needlessly large size. Most of the permanent cottages at Letchworth, including that awarded the first prize, had 9 in. external walls, which are quite unsuited to keep out the rain in this country.

#### The Royal Institute of Architects and the International Exhibition.

Our readers will remember that at the annual meeting of the Royal Institute of the Architects of Ireland, held in December last, the consideration of certain paragraphs of the report of the Council for 1905 was adjourned, and the Council authorised to recast the wording thereof, and to submit same, as revised, to the members for adoption. An adjourned general meeting was held for that purpose on Thursday, 1st inst., when the report as modified was presented. The members present, however, considered that the Council had gone rather far in the direction of modification, and on the motion of Mr. H. Allberry it was decided to adopt the report as originally presented by the Council and printed in December last. The matter being, so to speak, *sub judice*, we omitted the concluding paragraphs from our report of the December meeting, but now adopted. They read as follows:

There is one matter of public importance which occurred during the year, and in regard to which this report should not be silent, namely, the action of the Committee of the Irish International Exhibition in going across the water for designs and contractors for the buildings which they propose to erect at Ballsbridge in the year 1907. So much feeling has been aroused among the members of this Institute, owing to the extraordinary action of the promoters of the Exhibition, that it is difficult to deal with the matter. Suffice it to say, had the promoters approached this Institute, laid the whole matter before its Council, explained (if such be the case) that the funds at the Committee's disposal did not justify it in employing an architect, selected by competition or otherwise, under the ordinary recognised scale of professional remuneration, the Council ventures to assert that, rather than be a party to the extraordinary method adopted for obtaining designs for an Irish International Exhibition, it would have gladly nominated a committee of its members—architects of repute in this city—who would have placed their services gratuitously in the hands of the Exhibition Committee. The fact has apparently been lost sight of, that the Exhibition of 1907 should, in its design, as well as in the exhibits it will contain, display the condition of Contemporary Architectural Art in Ireland. In last year's report, it may be remembered, attention was drawn to the rapidly increasing number of instances in which important architectural works in this country were being carried out from the designs of English architects.

This unfortunate condition of affairs has in no way been mitigated during the year under review. The spirit which underlies this treatment of our profession is, indeed, the same spirit to which much of the unfortunate condition of this country may be fairly attributed. The very word "Irish" has come to predict something hopelessly perverse, hopelessly impractical. Those who look to England as the centre of culture and refinement will seek for guidance in things Architectural there also. It is earnestly to be hoped that the future will bring with it some amelioration of this unfortunate state of affairs and a truer patriotism not to be accredited to any one section of Irishmen. Before passing from this, the Council would wish to urge on its members that those of them who may be persuaded—and this is the more easy in these lean years—to take up subordinate positions as "Consulting Architects," looking after, locally, the interests of some employer who ignores their skill in design, and simply regards them as expensively paid clerks of works, are not upholding, as they should, the prestige of the profession to which they belong.

The "Consulting Architect" will soon, if it has not already, come to mean an individual by whose appointment criticism of the Public Bodies may be effectually stifled, or, in the case of private employers, a cheaper method of obtaining supervision than that necessitated by bringing an English architect across the Channel twice a month.

#### THE ARCHITECTURAL ASSOCIATION OF IRELAND

We have just received the "Green Book" for the session 1905-6, and it must be said to constitute a most creditable record of progress. The previous session is described as having been one of the best since the re-establishment of the Association in 1896. The membership now stands at the big total of 138. There was a net increase of thirteen members, notwithstanding the increase in the amount of subscription.

Reference is made in the report to the splendid generosity of Mr. G. C. Ashlin, who has again come to the aid of the Association, and with a donation of sixty guineas enabled the Association to enter into the present fine and suitable premises, an undertaking which it would otherwise have been impossible to face.

Neither the attendance at classes nor the competition for the prizes is creditable to the students, although better perhaps than in previous years. An average attendance of 9 or 7, and even less in some classes, is not a good record for an Association of 138 members, consisting largely of pupils and assistants, and does not argue any great interest in their calling. One class had to be abandoned.

The Library, too, is not so well supported as might be desired. The committee meetings have been extremely well attended, and the general meetings fairly so.

The general level of excellence in the character of the lectures has been more than maintained.

Taken as a whole, the results speak well for the unselfish efforts of the officers and executive, and are as good as can be expected until such time as examination is made competitive.

#### A HUNDRED YEAR OLD STOVE.

The Carron Company recently received an interesting letter from Mr. W. Waller, Sunny Dale Farm, Whitewood, N.W.T., Canada, relative to Carron Stoves. In the course of the letter he said:—"I will here mention a little item of interest to the Carron firm. I was on a business trip this fall in the north-east part of Saskatchewan; saw a box stove of what I thought was a new design in box stoves. On enquiring where the man got it, he said it was his great grandfather's, and that it was made by the Carron Company 150 years ago. I thought it most extraordinary for a stove to last that length of time. The stove belongs to the early settler's family that came out with Lord Selkirk."

This speaks wonderfully well for the lasting features of Carron manufactures.

In reply to Mr. Belcher's general appeal to the profession for donations towards defraying the expenses of the seventh International Congress of Architects, which is to be held in London this year, the Society of Architects has handed to Mr. Belcher a cheque for one hundred pounds for that purpose, and has also appointed twelve delegates to represent the society at the congress.

**Thurles.**—At the meeting of the Urban District Council on the 19th inst., Mr. George J. S. Kelly, C.E., Belfast, was appointed resident engineer to carry out the proposed waterworks scheme. There were 27 applicants.

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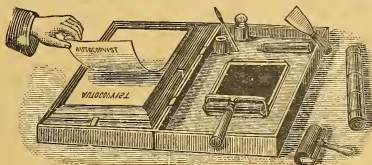
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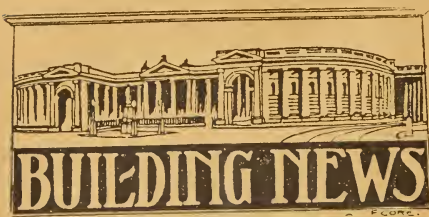
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**Athy.**—It is proposed to erect a golf club in Athy, and a sub-committee has been appointed to select a site.

**Athy Urban District Council** have appointed Mr. James F. Reade, A.M.I.C.E., of Westminster, their engineer, to prepare plans, etc., and carry out his scheme for the water supply of the town and suburbs which was awarded first prize in the competition held some years ago.

**Arklow.**—Tenders will be received up to 17th February by the Arklow Select Vestry for alterations and repairs to Tinahask Schoolhouse. Plans and specifications can be seen at Mr. Joseph Annesley's, 50 Main-street, Arklow.

**Ballina.**—The Board of Guardians invited tenders for the construction of a gate at entrance to fever hospital.

**Castlebar.**—The County Council is prepared to receive tenders for the erection of a strong room at the County Court-house, Castlebar (building work only) in accordance with plans and specification to be seen at the County Surveyor's office, Castlebar, up to and including February 12th.

**Cork.**—At the last meeting of the Cork Industrial Development Association, two delegates representing the Stonemasons' Society being present, the question of the importation of foreign stone was discussed, and a deputation was appointed to wait on the architects of the city to represent to them the advisability of using Irish cut stone in future.

**Cork.**—Tenders were received by the Very Rev. Canon O'Callaghan, P.P., for sundry alterations to the old Chapel, Charleville. Plans and specifications, prepared by Samuel F. Hynes, Architect, F.R.I.B.A., 21 South Mall, Cork.

The above-named Council received tenders for execution of the following works:—Constructing manholes in connection with Douglas sewers; erecting turnstile at Douglas Burial Ground; roofing caretaker's residence at Caherlag Burial Ground.

**Callan.**—The Board of Guardians of the Callan Union received tenders for fitting out as drying-room, &c., vacant room at rear of Fever Hospital.

The above-named Rural District Council received tenders for the erection of the old metals, &c., in the pump well at Seven Huses.

**Dublin.**—The Commissioners of Irish Lights are prepared to receive tenders for the supply at their store premises, Kingstown, County Dublin, of such quantities of the undermentioned articles as may be required during the year ending 31st March, 1907:—Artificers' tools, bedding and small stores, blocks, cement, coppersmith and plumbing work, ironmongery, iron castings, do. (mechanics' labour, etc.), ladders, timber (foreign), do. (planks, deals, etc.), do. (round), tin ware, and paints, oils, etc. Tenders close February 22nd.

The Corporation of Dublin is prepared to receive tenders for the supply of the undermentioned stores and articles, for twelve months ending 31st March, 1907:—Iron, ironmongery, dust bins, shovels, spades, picks, small metal castings, street surface boxes, coal-stopper covers, plumbing work, including brass fittings, hand and stand pipes, lead pipes, solder, block tin, plumbers' and labourers' services, timber watchboxes, wheelbarrows, oils, colours, disinfectants, glass, sponges, engine packing, lettering and painting street labels, cast iron water pipes, valves, hydrants, and special castings. Tenders to reach the Chairman of the Supplies Committee, City Hall, Dublin, on 14th February.

**Kingstown.**—At the last meeting of the Urban Council, several applications were received from architects for the preparation of plans for the erection of the proposed Royal Victoria Baths. A discussion arose as to whether the Council should now proceed with the election or refer the matter to a committee to arrange as to terms. The Council decided to proceed with the election, and on a vote being taken the following was the result:—Mr. Kaye-Parry, 12; G. T. Moore, 5; Messrs. Mitchell and Son, 2; and Mr. Beardwood, 1 vote. Having a clear majority, Mr. Kaye-Parry was appointed architect.

**Kingscourt.**—Tenders are invited for the erection of a house at Kingscourt, Co. Cavan, for J. H. Nicholl, Esq., from drawings and specification prepared by George F. Beckett, M.R.I.A.I., Architect, 97 Stephen's Green, South, Dublin, copies of which may be seen at the Architect's office and with Mr. Nicholl, at Kingscourt. Estimates before 23rd February.

**Limerick.**—Another difficulty in the masons' trade of the city appears to have cropped up, affecting about 70 men. Ever since the lock-out about two years ago relations have been strained, owing, it is said, to the fact that the masters would not get rid of the imported men, and the local men would not work with them. Now it is said that a conference between the masters, who want the per hour system of payment, and the men, who want the per day system, has come to nothing, and as the men will not agree the masters have lock'd them out.

The Burke Motor and Engineering Company, Clonmel, intend opening a branch in Limerick. They have already acquired a site in a central part of the city, and building operations will commence at once. According to the plans, the garage and show-rooms will be one of the biggest in the Three Kingdoms.

**Monaghan.**—The Proposal Committee of the above County invite tenders for the following works at Monaghan County Court-house—Repairing defective walls, providing drainage and water supply, miscellaneous works at roof and body of court-house, erection of shed in courthouse yard; Clones Courthouse, repairs and alterations to courthouse. Tenders to be lodged on the 19th February.

**Middleton.**—The Rural Council will to-day (Saturday) appoint a competent tradesman as Clerk of Works, at a salary of £2 per week (which is to include preparation of specifications, travelling, and all other expenses). The person appointed must devote his whole time to the business of the Council, and carry out any orders he may receive.

**Slievardagh.**—The above Rural District Council received applications from engineers for carrying out the several works in connection with 7th Cottage Scheme under Labourers' (Ireland) Acts.

**Tulrow.**—At the meeting of the Carlow Union Mr. O'Donnell, Board's Engineer, submitted new plan and specification for the hospital. He estimated the cost at £3,500. The first estimate was £2,300, but they could not possibly go on that, as the prices were all wrong, and the work could not be carried out at the prices. He estimated the prices as low as he could, and he believed they would not get any contract on the former specification. His estimate was for plain, useful work, without ornamentation. After some discussion the plans were adopted, subject to the approval of the L.G.B.

**Waterford.**—The NEW TECHNICAL SCHOOL.—At a meeting, over which his Lordship the Bishop presided last week, a subscription list was opened for the purpose of raising funds for the erection of a stone front for the new Technical School now in course of construction. The amount required is £400. Dr. Sheehan has already subscribed £200 and a further £100 was subscribed at the meeting, so that £100 only remains to be subscribed.

**Wicklow.**—The Urban District Council invite tenders for the construction and erection of a new roof and other works at the Market Hall, Wicklow, in accordance with plan and specification prepared by Mr. J. Pansing, Town Surveyor, which may be inspected and copied at the Town Hall. Tenders close on 12th February.

**Wexford.**—The Corporation of Wexford received tenders for executing repairs on store at Gibson-street.

**Youghal.**—At the meeting of the Urban Council plans and gross estimate for the erection of 10 cottages in Cork-lane and 7 in South Cross-lane were received from Mr. Edwin Green, C.E., the cost of each cottage in Cork-lane being £160 10s. 5d., and in South Cross-lane £161 14s. It was decided to discuss the details with Mr. Green at a committee meeting of the whole Council.

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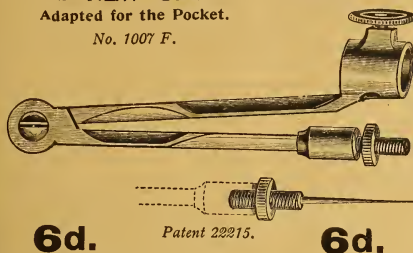
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# ENGINEERING SECTION.

## ITEMS.

A new bridge, at a cost of £250,000, has just been constructed across the Ganges. It consists of 15 spans of 200 feet each, and, in accordance with the custom by which the name of the Viceroy is bestowed upon the most important bridge constructed during his term of office, it has been called the Curzon Bridge.

We learn from our dictionary that a road is an open way or public passage; a highway; a means of approach. Whether the roads in and around Bray may be considered to come within the limits of the above definition is open to question. A motor or cycle trip from the station to Enniskerry is an object lesson to the layman how not to maintain roads, for what with the ostensible repair by throwing loose stones on the surface, and the temporary repairs after the big flood, this highway has a distinct resemblance to a badly kept west country "boreen." It seems practically impossible to instil into the minds of the authorities concerned that the proper upkeep of the roads is of the first importance, and the strain on tyres and temper continues undiminished.

The ordinary passenger service through the Simplon tunnel was inaugurated at 8.56 a.m. on January 25th. It is, therefore, but seven and a half years since the borings were commenced simultaneously on both the Swiss and Italian sides of the mountain, and nearly two years over the contract time allowed for completion, which expired in May, 1904. The chief cause of this excess was the unexpected encounter with hot springs, one of which alone discharged 600 gallons per minute, at a temperature of 117 degrees Fahrenheit. The difficulty seemed for the moment almost insuperable, but was at length overcome by the introduction of ice, the use of sprays, and the dilution of the hot streams with cold water. The Simplon tunnel, which is 12¼ miles in length, and therefore considerably longer than either the Mt. Cenis, St. Gothard, or Arlberg tunnels, which are 7½, 9½, and 6 miles respectively, only rises to a height of 2,310 feet above sea level, whereas the Arlberg attains an altitude of 4,300 feet. Steep gradients had been avoided, the sharpest is but 1 in 40, and that extends only a short distance. Only one of the two tubes is now in use, a siding having been provided about midway for present purposes. The second tube is about 56 feet distant, and is left in a rough hewn condition; it is connected with the completed tunnel by cross galleries, some 100 yards apart. The borings are oval in shape, measuring 18 feet in height by 13½ feet greatest breadth. The estimated cost of the undertaking was £2,350,000, but this sum has been greatly exceeded owing to the difficulties before mentioned.

Mr. James Dalrymple, general manager of the Glasgow Corporation Tramways Department, recently delivered a lecture on "Tramways in Glasgow and elsewhere." It will be remembered that Mr. Dalrymple visited America last summer, and while his remarks as to the tramway systems in this country were, as may be expected, extremely instructive, far more interest will be discovered in his description of the methods which are adopted by our American cousins to cope with the enormous volumes of street traffic in that country. Chicago formed the chief centre for his study, a city with an area of 194 square miles, and a tramway system extending to 700 miles of single line, which serves a population of 2,000,000. This system is, in Mr. Dalrymple's opinion, the worst, in practically every respect, that he had ever seen. For years the Tramways Committee of the City Council have been disputing about the system, the result being that the companies working it have inefficiently maintained it. At length a crisis has arrived, and the solution of the difficulties proposed is for the City Council to take over full control. The Glasgow expert has embodied his views on the whole question in a letter at the request of the Mayor of Chicago, and when this sees the light of day it should prove highly interesting reading. The United States has been boomed so much of recent years, that the country has come to be looked on by the majority of people as the home of all that is best in creative intellect. In management it is perfectly apparent there is still much to be learnt from the "captains of industry" in the Old World.

The discussion as to the causes of the failure of the roof of Charing Cross Station, both primary and contributory, is still affording opportunity for the airing of wild theories and much useless criticism. The result of professional and expert opinion clearly indicates that the fracture occurred through an inherent flaw in the tie rod, which had been slowly extending for over forty years. Much of the alarm that has been felt for the safety of other large roofs is thereby set at rest, but there may be much reason for apprehending the existence of similar defects in tie rods made prior to 1875, for, before that date, the resources of iron manufacturers were unequal to the rolling of large diameter bars of considerable length without the employment of welds. Even nowadays the connections between the various portions of a metal truss have often, owing to the nature of their design, to be welded to the rods and bars, and the defect might probably be beyond perception. It is therefore far safer to design simply and form all connections with plates, nuts, and bolts, and thus eliminate the principal danger of failure.

The chairman of the South Eastern Railway Co. recently stated that the station would be re-opened this month. The new roof will be an improvement on that in use at Euston. The cost of restoring the station is estimated at £60,000.

Public interest has lately been centered upon rapid railway construction in South Africa above the Victoria Falls, where the engineers are daily extending the Cape to Cairo railway northwards. The work that has been proceeding in Northern Africa has, however, recently been brought prominently forward by the public opening by Lord Cromer on January 27th of the Nile Red Sea Railway. The function was performed in the presence of many of the British officials of the Soudan Government, the Governor of the Red Sea provinces, and a multitude of Sheikhs, omdas, and other local notables. Colonel Macauley, R.E., who is the director of the Soudan Government Railways, and to whom the chief credit of this important engineering work is due, gave a most interesting account of the construction of the line. The new route from Khartoum to the sea has been shortened by 900 miles, the former method of communication between Atbara and Alexandria being by a line of railway and river steamers, over a distance of 1,200 miles. The reduction of time, and obviation of grave inconvenience, will doubtless result in the fulfilment of Lord Cromer's prophecy as to the immense development of the Soudan which will take place in the near future.

The work was carried out under most adverse conditions, as, owing to the insufficiency of the water supply, it became necessary to obtain water for the working parties, and most of that used in the construction and engines, by the distillation of sea water, which had to be conveyed along the line in special designed tank wagons. The length of the main line is 331 miles, and there are in addition 25 miles of sidings. The work occupied the comparatively short period of fourteen months, which, having regard to the climatic conditions of the country, constitutes an achievement of which all those engaged in the undertaking have every reason to be proud. The cost of the railway was £E1,375,000, or £E4,150 per mile of main line. The £E is equal to £1 os. 3½d. English currency.

But the work described by no means exhausts the energy of the officials responsible for the well being of these Anglo-Egyptian provinces. It is but the preliminaries of Sir William Garstin's vast programme for the improvement of the country. Before long another line from Kareima to Abu Hamid will be opened, and the wealthy territory of Dongola brought into touch with the sea. Irrigation works are about to be undertaken, and a bridge thrown over the Blue and White Niles at Khartoum. Egypt, therefore, is offering a fine field for the capable engineer. It is scarcely credible that in the closing years of the last century the Soudan was occupied by a barbarous race, and that a British army was slowly and surely making its way towards the centre of all this enterprise and development confronted by the hordes of the Mahdi's followers. Gradually, under suitable direction and by the aid of many hands, the twin ribbons of steel have extended and opened up this vast tract to commerce and industry.



The *Daily Mail* has discovered a new danger, "Vibrationitis." In consequence of the excessive and continuous vibration caused by heavy motor traffic and underground railways, there have been numerous instances recently in parts of London of stoneware drains becoming defective, and Dr. Winter Blyth, in an interview with a representative, stated that he had consequently to recommend the substitution of iron pipes. The Surveyor to the Holborn Borough Council said that while the drainage in the borough had been but slightly affected, the subsidence of buildings was the most serious danger to be feared owing to drainage of water from the foundations caused by the tunnelling.

Readers of *The Times* Financial and Commercial supplement for 1905 who may be conversant with the depressed condition of trade in this country, will rub their eyes with wonder at the cheery optimism that pervades it. The article on "Progress in the Engineering Trades" certainly bears the stamp of authority, and it indicates such a development of engineering progress as to cause the most pessimistic to anticipate a revival. "The keynote of 1904 was 'hope'; that of 1905 was 'anticipation,'" and later in the year "order books began to show a better appearance, but not until well within the last quarter of the year was it generally admitted that trade was brisk and prospects brighter."

Fortunately there is but little reason to doubt that after a period of the gravest depression the pendulum has begun to swing in the opposite direction, and that the outlook is gradually becoming brighter. The blighting effects of the late war are now passing away, and the inevitable revival may be expected. Such improvement does not immediately become noticeable in the building and engineering trades, so that while at present the state of business leaves much to be desired, it is extremely probable that the boom experienced in England will gradually travel westward.

#### REVIEWS OF CATALOGUES.

**Messrs. J. P. Hall and Co.**, electrical and general engineers, Blackriding Ironworks, Oldham, issue a well illustrated book, the object of which is to show the various types of dynamo, motors, steam engines, etc., manufactured by them. The illustrations are excellently produced, and show a great variety of dynamos, transformers, generators, and motors for various purposes, such as pumps, cranes, etc. **Messrs. Hall** are contractors to the Admiralty, War Office, Post Office, the Indian and Colonial Office, as well as to the Japanese and other Foreign Governments.

**Messrs. Kirchner and Co.**, Tabernacle-street, London, E.C., issue in handy form an extract from their catalogue, dealing with their principal wood-working machinery. Most of the machines manufactured by the firm are illustrated and briefly described in this little pamphlet, which is a kind of index to their larger publications. It also contains a chapter of general information on the adjustments and care of power saws and planing machines, with some remarks on belt-driving, pulleys, sharpening planing knives, and other items of interest to saw-mill proprietors. This booklet, as well as the larger catalogues and price lists, can be had on application to the company.

**Messrs. Aveling and Porter, Ltd.**, of Rochester, Kent, and 72 Bunson-street, London, E.C., submit to us an interesting pamphlet, dealing with steam road rolling. The subject of steam rolling has been recently dealt with at considerable length in these columns, and it is now generally admitted that for efficiency and economy in road construction the employment of one of these machines is essential. Every year the custom of rolling new and repaired roads before throwing them open to the public becomes more general, and though the first cost of a steam roller is considerable, it is one of the most profitable, and should be one of the most popular, outlays a corporation or county council can sanction. Most of the fully-occupied rollers pay their first cost in two or three years by the saving in material and labour alone. Mr. Hooley, the Nottingham County Surveyor, says in his well-known pamphlet on the Management of Highways: "Any authority using a roller for a few years will wonder how roads could ever be managed without one." **Messrs. Aveling and Porter** are amongst the pioneers in the manufacture of these machines, and the products of their extensive factory are used all over the world. It may be mentioned that in London and the suburbs upwards of 120 of their steam-rollers are employed, while the Dublin Corporation possesses three of their rollers bearing the trade mark of the firm, "Invicta," which is probably familiar to most of our readers. **Messrs. Aveling and Porter's** rollers, scarifiers, and road-repairing machinery embody the most up-to-date improvements. The engines are fitted with either single or compound cylinders, the latter being a very

recent development. **Messrs. Aveling and Porter** are also manufacturers of traction and other portable engines, boilers, agricultural machinery, and traction waggons. These are fully described in a separate catalogue. Both the steam-roller and general catalogue can be had on application to the firm.

Under the title of "Modern Staircase Construction," the **Safety Tread Syndicate, Ltd.**, 15 Barbican, London, E.C., issue an interesting booklet dealing with the company's speciality, which is Mason's Patent Non Slipping Treads, Staircases, and Covers. Although the booklet in question has only been issued a few weeks it does not deal with anything new or novel, because Mason's Patent Treads have now been in use a great many years, and are well known in every civilised country. The problem of durable non-slipping stairs and surfaces where there is pedestrian traffic has sorely taxed the inventive genius of engineers for many generations. It has been found that no material, natural or artificial, is proof against the wear and tear of the unceasing passing to and fro of men. Each individual footfall may be light, but just as "constant dropping wears a stone," so foot following foot, if sufficiently frequent or long continued, wears down the strongest products of nature or art. This is particularly noticeable in staircase treads exposed to much traffic. Whether the material be wood, stone, metal, or concrete, in every case it becomes in the lapse of time worn into hollows, and with the wearing becomes slippery, and, therefore, dangerous. When many years ago "Mason's Patent Tread" was introduced, it was held by those best qualified to offer an opinion that an approach to the solution of the problem had been reached, and so it was. No more eloquent testimony can be found than the universal adoption of this tread, and in the years that have elapsed since its first appearance, it has been so much improved that now it may be said to be practically perfect. It is used in every country on public stairways, pavements, railways, in hotels, offices, on steamships, and railway cars, in fact wherever there is pedestrian traffic. To give a few concrete examples, we may mention that "Mason's Tread" is to be found on every step of the Tower Bridge, Blackwall Tunnel, Central Electric Railway, Brooklyn Bridge, New York, and nearly all the railways in the United Kingdom. Although of such utility "Mason's Patent Treads" are very simple in principle. They consist of nearly equal proportions of lead and steel, iron, or bronze. The lead is inserted in dovetailed grooves in any of the three last named metals, all three of which are chilled for wear resisting. The lead gives the hold to the foot on the stair, and in addition to this the grooves between the serrations of lead laid transversely to the line of traffic act as an additional grip. The ribbed plate of chilled metal is specially hardened to resist the wear and tear of foot traffic, and holds the lead which cannot wear away any more quickly than its hardened component parts. These treads can, of course, be used in every form of new staircase and pavement construction, and they are also specially suitable for the repair of wood, metal, stone, and concrete staircases. Drawings, samples, estimates, and advice can be had free on application to the Safety Tread Syndicate, Ltd., at the above named address.

#### IRISH MATERIALS.

At a meeting of the Cork Industrial Development Association the Secretary reported that during the week a deputation from that Council, consisting of President Windle, Mr. Crosbie, Mr. Ellis, Mr. McNamara, and Secretary, waited on several of the city architects to interest them in their specifications for building, and endeavouring to procure as much employment as possible for local tradesmen in connection with such work. He said that they were unfortunate in so far that they failed to find many of the architects in their offices when they called, but those they did see met them with the utmost courtesy, and exhibited a keen sympathy with the objects referred to by the deputation, and promised to avail of every opportunity of carrying out the deputation's wishes.

The annual dinner of the Engineering and Scientific Association takes place on Saturday night in the Gresham Hotel, many distinguished speakers, including Sir Anthony McDonnell, the Provost of T.C.D., Monsignor Molloy, the Earl of Drogheda, the Lord Mayor, etc., have accepted the Society's invitation.

The fourth ordinary general meeting of the Society of Architects for the Session 1905-6 will be held at Staple Inn Buildings, Holborn, on February 15, when the gold medal of the Society will be presented to Mr. Walter W. Thomas J.P., Past President. Mr. Ellis Marsland will read a paper on "The Architecture of the Cotswolds, 16th and 17th Centuries." Ladies are especially invited to this meeting.

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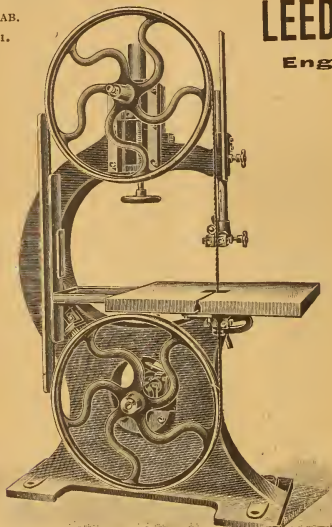
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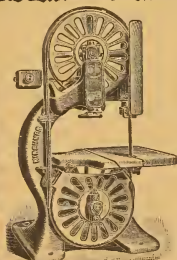
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## LAW.

**Cork Builder's Action Against Galway County Council.**

Mr. Justice Gibson and Mr. Justice Boyd on Saturday adjourned until to-day an application made on behalf of Mr. Samuel Hill, building contractor, Cork, for a discovery of certain documents for the purpose of his action against the County Council of Galway for the balance of certain moneys alleged to be due in respect of buildings erected by the plaintiff for the defendants—namely, the Ballinasloe Lunatic Asylum and accessory buildings. Something less than £50,000 was paid before the architect's final certificate, which bore date 9th June, 1904, and the balance said to be due substantially amounted to £4,900.

Mr. M. J. Burke, K.C., for the plaintiff, said all they wanted to see was the minutes containing the reports of the architects to the County Council.

Mr. Longworth explained that he had not seen the minutes, as Mr. Doyle, K.C., had been previously junior in the case.

In adjourning the application until Friday, the Court directed that every portion of the minutes except those dealing with the architects' reports should be sealed down.

**Clontarf Drainage.**

In the King's Bench judgment was given in the case of the King (Bradshaw) v. the Lord Mayor and Corporation of Dublin. The case came before the Court as an application by Mr. Picton Bradshaw, one of the largest ratepayers in Clontarf, to make absolute a conditional order of mandamus, dated 23rd November last, directed to the Lord Mayor, Aldermen, and Burgesses of Dublin, requiring them to show cause why they should not at once proceed to carry out the system of drainage for Clontarf township in connection with the Dublin Main Drainage scheme. The laying down of mains for the distribution of electrical energy for the lighting of the township, as agreed to under the terms of the Act of 1900, also formed part of the ground of the application.

The Lord Chief Baron, in his judgment, said the motion had come before the Court last week, and it stood for judgment, not because the Court had any doubt as to the principles applicable to it, or as to the application of those principles in reference to one of the matters, namely, the main drainage, but for himself he was anxious as regards the second part of the application, that which related to the electric lighting, to look into the local Acts of Parliament affecting the Corporation, to see whether there was—as had been stated for the defence—any substantial ground for alleging that, if the application were granted with regard to the electric lighting, it would be impossible for the Corporation legally to carry it out. His Lordship having referred to the Act of Parliament passed in the year 1900, by which the township of Clontarf was incorporated with the city of Dublin, and the undertaking given by the Corporation of the city to those representing Clontarf that a system of drainage for that township should be executed and connected with the Dublin main drain, within a certain specified time, said that that period had expired on the 9th August, 1903. The duty imposed on the Corporation by the Act had not been carried out. What had they done? Nearly two years after the passing of the Act, on the 17th May, 1902, Mr. Buckley was ordered to prepare plans, sections, and estimate for the scheme. In August, 1903, Mr. Buckley reported that he required additional assistance, which he did not receive. He repeated his request in March, 1904, more than six months after the expiration of the statutory period. It did not appear that these plans had been prepared up to the present time. On the 10th July, 1905, a resolution was passed by the Corporation asking that the Borough Surveyor should report why the main drainage of Clontarf was not being carried out simultaneously with the drainage of the old city, and the Surveyor replied that he was not aware that it was the intention that the work should be carried out simultaneously. Something had since been done in the matter of ascertaining the extent of the existing drains, and some details and calculations had been made. But what did it all amount to? It only showed how little had been done, and also how much might have been done that ought to have been done. It seemed to him to be a mere excuse, and it was clear to him that the Corporation had been acting in the teeth of the Act of Parliament. He entertained no shadow of doubt that the Court should fail in its duty did they hesitate for a moment to make the order absolute. The second part of the application was easily dealt with. The Corporation had done absolutely nothing to carry out the duty that was imposed upon them by the 64th section of the Act of 1900. They had treated that clause as if it were waste paper. The period of four years, within which they were

bound to provide electric lighting for Clontarf, had long since expired, and it was not yet pretended that the Corporation had yet laid down any of the distributing mains in the Clontarf district. The answer of the Corporation to this was that they could not perform that duty without committing illegal acts. The Court had not been informed by affidavits of any facts that would render the performance impossible. Assuming that Parliamentary powers were required to carry out certain parts of the work, the Court had not been satisfied that the work could not be done without committing acts of illegality. Clontarf area was now part of the city of Dublin, and the statutory powers of the Dublin Electric Lighting Act of 1892 applied to it, and the Corporation appeared to him to have sufficient power under that Act to carry out the duty that was imposed upon them. At present the Court was without legal evidence as to it. The more he considered the Act the more he found that the argument that the Corporation had not the necessary power was unsustainable. Therefore the Court made the order of mandamus absolute. Mr. Justice Johnson and Mr. Justice Kenny concurred.

Serjeant Dodd said, on behalf of the Corporation, that they did not seek to put the applicant here to any further cost. They would allow the order to go, and the Corporation would comply with it as quickly and as promptly as may be. If the order were made in the form of an injunction it could be given effect to in the event of the Corporation not doing the work with convenient speed.

The Chief Baron—We make the order for a peremptory mandamus.

Serjeant Dodd—What I suggest is that you make this order on our undertaking to do the work, with liberty to the other side to apply if we don't act quickly. It may be necessary to get the money.

The Lord Chief Baron—I am of opinion that the fact that you have got no money is absolutely no answer to the writ. You can get it elsewhere than from the Local Government Board.

Serjeant Dodd—We have to get their sanction.

The Lord Chief Baron—Do you think we would allow the carrying out of our order to depend upon the action of the Local Government Board?

Serjeant Dodd—I am sure you would not.

The Lord Chief Baron—The remedy for breach of this mandamus is by sequestration of the goods of the Corporation, and that sequestration could never issue without our order. We will consider whether you have shown due diligence, but we will be very strict with you.

The Chief Baron also made acknowledgment of the clear fashion in which Mr. Rice, solicitor to the Corporation, had all the books for the Court. This, said his lordship, had saved the Corporation much expense.

**Pearson and Co., v. Dublin Corporation.—Application for New Trial.**

In the King's Bench Division, before the Lord Chief Justice, Mr. Justice Gibson, Mr. Justice Boyd, and Mr. Justice Wright, arguments were opened on the application in which Messrs. Pearson and Co., Ltd., contractors, London, seek, upon notice of motion, to have a new trial of their action against the Dublin Corporation, claiming damages laid at £36,000 odd for alleged fraudulent representation, as the result of which they declare they were deceived and misled in the making of a contract for the construction of certain outfall and purification works at the Pigeon House in connection with the Dublin Main Drainage scheme.

Mr. Campbell, K.C., in opening the case, said the motion was for the purpose of reviewing the direction that was given in favour of the defendant in the trial of the action by the Lord Chief Baron, and of having it reversed. The plaintiffs were a well-known extensive firm of London contractors, and the action was against the Lord Mayor, Aldermen, and Burgesses of the City of Dublin. There were two sums claimed in the action, but one of them was now out of the case. The first sum was £11,007, which was retention money under the contract, but that had been paid after the issue of the writ by arrangement with the Corporation. The only sum, therefore, with which the action was really concerned was a sum of £36,374, which was the measure put upon their claim for unliquidated damages arising under practically two independent counts—one under the contract and the other for misrepresentation. The Lord Chief Baron ruled against that claim, in so far as it was claimed under the contract, but at present he did not propose to trouble his lordship upon that branch of the case. He had also ruled against the plaintiffs in so far as their case was based on their claim for damages for fraudulent misrepresentation, and it was with regard to that that they intended chiefly to challenge the Lord Chief Baron's ruling. The contract was for the construction of precipitation works and purification works at the Pigeon House in connection with the main



drainage. The view taken by the Corporation officials who prepared the specification and plans was that the old Pigeon House harbour, which was of substantial size, would, if pumped out dry, provide an available space which would form the site for these purification tanks. This harbour had on the river side as its retaining wall the old Liffey wall, which ran down from Ringsend and continued out towards the sea until it terminated in the Poolbeg Lighthouse. This wall was an important factor in the scheme, because the idea apparently was that by continuing it across the mouth of the harbour and lining it with cement on the inside it would effectually close the inrush of water and enable the harbour to be pumped out and kept dry and watertight. In other words, it was to act as a dam. In accordance with that idea a number of plans were prepared by the Corporation through their responsible officials, Mr. Chatterton, consulting engineer, Mr. Hart, the city engineer, and Mr. Hellins, who was appointed specially for this work and named the resident engineer. The plans were prepared on the joint authority of these three gentlemen, and for their work the Corporation was responsible. The defendant's case was that on each and all of these plans there was shown in the plainest and clearest way, and vouched for, that this outer Liffey wall had a foundation running to a depth of nine feet below ordnance datum, which, in other words, meant below the bottom of the Liffey. This was shown over and over again on the plans, and not only that, but on the top of each page there was written a statement that "the existing walls are shown at their correct levels." That was the first case of misrepresentation relied on. They also said that the specifications necessarily involved the existence of these foundation walls, because the work provided for would have been physically impossible had there not been these foundations nine feet below the ordnance datum.

The Lord Chief Justice—Do you say that the contract was induced by misrepresentation?

Mr. Campbell said that was so. The curious thing was that the Lord Chief Baron held there was misrepresentation in fact, but he found that though the misrepresentation was made it was not intended to be acted upon. With all respect to the Lord Chief Baron he (counsel) submitted that that was a question for the jury along with the abundant evidence that was produced on the subject. It was quite within the rights of the Corporation to have said to the plaintiffs—"We want certain work done, and it is for you to make up your minds before you tender whether the work can be done at all or not"—but they had no right to go out of their way and set a trap for the contractors which prevented them doing what they otherwise would have done—namely, make inquiries for themselves.

Mr. Justice Gibson—Was there any order that these plans were put forward with anything but what they bona fide believed were the correct facts shown on them?

Mr. Campbell said the evidence was conclusive that they had no knowledge or information about these foundations at all. He did not say that the evidence the plaintiffs gave was not capable of being rebutted, and that there would not have been an issue to go to the jury, but having regard to the course that counsel for the Corporation forced on the Lord Chief Baron, the Court had now to take the case on the assumption that the plaintiffs' evidence was correct. In his opinion it was impossible for any Court to say that there was not substantial evidence to go to the jury, not only that there was misrepresentation, but that it was false to the knowledge of those who made it, and that it induced the plaintiffs to tender at a lower price than they would have known the facts. They were led to believe that all they had to do was to block up the harbour mouth and put a concrete lining on the harbour side of this boundary wall. But as it turned out the wall had no foundation below ordnance datum. It was what was called a Chinese wall.

The Lord Chief Baron—Why a Chinese wall? Was it made by Chinese labour? (Laughter.)

Mr. Campbell—That is not fashionable now, my lord.

Mr. Justice Gibson—How did it last so long?

Mr. Campbell said it was 20 feet wide, and he supposed it had settled into a solid block and made a foundation for itself. But it had not one inch of the foundation shown on the plans. That was a common case.

Counsel then proceeded to deal with the technical details of the case.

Mr. Campbell, K.C., in continuing his argument on behalf of the plaintiffs, said that if he established actual deceit or misrepresentation against the Corporation his clients were entitled to succeed in their claim. He did not care by what name it was called—

Mr. Justice Gibson—Call it fraud.

Mr. Campbell—Or actionable misrepresentation. If he succeeded in establishing that, then his contention would be that not only was there no authority to be found in the books for the proposition that a man could protect himself

against that by saying that he did not give a guarantee, but that there was abundant authority for the proposition that no stipulation of that kind will exempt or save him from the consequence of his misrepresentation if it has been followed and relied upon by the other party to the contract, and if damage has resulted to him. Mr. Hellins, who was the Corporation witness with reference to the accuracy of the plans, took up the position in the first portion of his evidence that the plans were deliberately designed for the purpose of showing to the contractor that there was every doubt whether the foundation walls existed or not. Ultimately he was driven from that, and the final position he took up was that the plans were deliberately designed for the very reverse purpose—that is, that they were deliberately designed to show these walls as existing, and that that was done for the express purpose and object of inducing the contractor to tender at a smaller figure. Nothing could be clearer than Mr. Hellins' evidence on these particulars. They had the sworn, positive, and reiterated averments of this gentleman that practically having no accurate or definite information on this matter these three engineers deliberately designed and agreed that they would express these foundations as existing on the maps for the express purpose and object of inducing the contractor to tender at a lower figure.

At the time of going to press the case is still at hearing.

### TRADE UNION LAW.

A very interesting history of the legal vicissitudes of Trade Unionism in England was given by Mr. M. N. Druquer recently in a lecture at the London Institution.

Trade Unionism, he remarked, was called into existence by the problem of how a worker could legally obtain a living wage.

The right to such a wage was, in a way, recognised as early as the reign of Edward III., when wages for certain trades were regulated by Parliament. In the reign of Queen Elizabeth power was given for an appeal by workmen in any district to the Justices of that district for the latter to fix a living rate of wage for the district.

In the eighteenth century Trade Unionism got so powerful that, in 1799, laws against combination were passed.

In 1824 the "Combination" Laws were repealed, but in 1832 it was re-enacted that combinations for certain purposes were illegal.

The history of latter-day Trade Unionism (said the lecturer) has turned upon the common law as to conspiracy, and it was now held that a combination which tended to restraint of trade (by strikes, etc.) was no longer illegal.

Mr. Druquer subsequently dealt with the quasi-legal status now afforded to Trade Unions, and their responsibility at law. In the Taff Vale case it was contended that the Union was sufficiently recognised by the law to be made a defendant and mulcted in damages.

On the other hand, the Union was not a legal Corporation, and therefore it was contended that it could not be made a defendant as a Society. Another celebrated case (Quin v. Leatham) was also discussed by the speaker, who thought this proved the principle that the law held it a conspiracy to combine to unduly injure any person.

"Trade Unionism is not yet free from the bugbear of conspiracy at common law," was the concluding remarks of Mr. Druquer.

### MINERALS IN COUNTY DONEGAL.

The *Derry Journal* reports that a few days ago Mr. Edward Haughey, Donegal, who has considerable experience as a mining prospector, discovered a seam of coal at Drimmin, near Lough Esk. The coal is pronounced of excellent quality, being particularly adaptable for smith work. Following up the seam, which runs behind the Donegal hills in a northerly direction, Mr. Haughey found indications of the seam enlarging. It is believed since the mineral has been found near the surface the deposit is of sufficient quantity to make it workable at a profit. There appears to be no doubt as to its good burning qualities. Although in the geological map coal is shown to exist in this district, it has hitherto been thought that, like many other parts of Ireland, it does not exist in sufficient quantity. Of course until the depth of the bed is ascertained and other investigations made, it will be difficult to foretell the outcome of the discovery from a commercial point of view.

A Building Trades Exhibition is to be held at St. James' Hall, Manchester, from April 25th to May 5th. The exhibition will be under the management of Mr. Walter Cawood, who has had considerable experience of the promoting of trade exhibitions.



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## ENGINEERING NEWS.

**Ballasloe.**—At a meeting of the above Urban Council on the 16th January it was decided to employ an expert to report on the present working of the waterworks, the cost of the pumping of the water being very excessive.

**Balrothery.**—At the last meeting of the Rural District Council the Council proceeded to the election of an engineer, at a salary of £100 per annum, to superintend all works of an engineering nature in connection with the District Council and Guardians. There were over 30 applications for the post. On a vote being taken, the first round resulted in Mr. P. McCarthy obtaining 15 votes, Mr. A. Scott (A. Scott and Sons) 14, and two other gentlemen one each. Mr. McCarthy not having a clear majority, another round was necessary, the voting in which was as follows:—For Mr. Scott, 16; for Mr. McCarthy, 15. Mr. Scott was declared elected.

**Cork.** Mr. Michael Riordan has been elected Resident Engineer of the Cork Waterworks. He had been placed third on the list.

**Cavan.**—At a recent meeting of the County Council a copy of a resolution was received from the Society of Architects, Belfast, asking the County Council to prevent their surveyor from doing anything outside the county work. Mr. Somerville, the County Surveyor, said it did not refer to this Council, since he had no authority to take any private work.

**Cashel (RURAL COUNCIL).—THE WATER SUPPLY.**—The following report addressed to the Town Clerk, was read from Mr. Francis Bergin, B.E., Dublin:—"Since receiving your last letter I have looked up my reports of the 16th of March and 10th of April, and again carefully examined plans of reservoirs, etc. In my first report I pointed out that sixty thousand gallons of water should be provided per day in order to afford your city an adequate supply. The springs at Boscabell are evidently unable to yield this quantity during the summer months, and as the storage capacity of your present service reservoir, viz., 1,320,000 gallons is obviously inadequate to equalise the winter and summer flow to same, the supply to your city for ordinary domestic purposes must necessarily be insufficient during periods of drought. There are only three ways in which this supply can be increased exclusive of pumping, viz.:—(1) By tapping a new source capable of yielding over 60,000 gallons per day at all times of the year. (2) By storing the surplus flow from the existing source during the winter months if such is sufficient, which can only be ascertained by gaugings extending over several months. (3) By storing the yield of some new source such as that proposed at Kilballyherberry. There is no source available at a reasonable distance, that I am aware of, capable of yielding over 60,000 gallons per day, that would command the higher portions of the city, and hence the existing supply to same can only be increased by providing adequate storage. If, after careful gaugings, it was found that the surplus winter flow from Boscabell springs would, if stored, be sufficient to supplement the same, a storage reservoir of adequate capacity could be constructed alongside the existing service reservoir, and possibly on the land adjacent to same in the Council's possession, but if necessary I presume a narrow strip of the adjoining field could be acquired either by agreement or compulsorily. If the surplus winter yield from the Boscabell springs should be found incapable, after being stored, of sufficiently augmenting the dry weather summer yield, then the Council would have no alternative but to fall back on some new source, such as that proposed at Kilballyherberry. As some steps must, I presume, be taken in the very near future to supplement your present supply, and as it is only after making careful gaugings for some months, obtaining measurements and levels of the land suggested for the proposed indispensable storage reservoir, etc., that an accurate estimate of the costs of the necessary works can be prepared, it would probably be best for the Council to authorise me to get out plans, etc., and estimate for whatever works may be absolutely necessary to adequately supplement your present supply in the least expensive manner, which I would be happy to supply on the usual terms, viz., 5 per cent. on the cost if carried out, or 2½ per cent. on the estimate if not carried out. The work referred to should be commenced without delay. The cost of Kilballyherberry scheme I have already estimated at £3,000, whereas if the surplus water from the Boscabell springs be found sufficient, the cost of the necessary works would probably not exceed £1,500, but as already mentioned, an accurate estimate cannot be submitted until the detail plans have been prepared.—Yours faithfully, Francis Bergin."

**Ennistymon.**—In our advertising columns this week the Rural District Council invite tenders for the construction of a combined water supply for the towns of Ennistymon and Lahinch, Co. Clare. Drawings and specification can be seen on application to the engineer, Mr. Brian E. F. Sheehy, at his office, 57 George street, Limerick. Bills of quantities, prepared by Mr. James Mackey, Surveyor, 58 Dame street, Dublin, may be obtained from him, or the Engineer.

**Genties.**—At the weekly meeting of the above Rural District Council Mr. M. O'Callaghan, C.E., Letterkenny, was, after a

long discussion, appointed as engineer in connection with the scheme for labourers' cottages initiated by the Council.

**Kingstown.**—The Commissioners of Irish Lights are prepared to receive tenders for the supply and delivery at their Stores, Kingstown, Co. Dublin, of new lamps and lamp fittings, and also repairs to lamps, as may be required during the year ending 31st March, 1907. Tenders will be received on 22nd February.

**Louth (COUNTY COUNCIL).**—The county surveyor read a letter from Mr. Oliver, engineer to the Department of Agriculture and Technical Instruction, asking that he might be allowed to modify the plans for the construction of the Sluiceway pier, in order to enable him to carry out the work at the sum agreed on—viz., £300—as already he found the work getting into financial straits owing to the difficulties encountered in it. From the discussion, it appeared that the work was undertaken by Mr. Oliver for £300 on behalf of the board—the half of which is borne by the Department, and the other half by the County Council.—The surveyor stated that his estimate for the work was £400, and he did not know how Mr. Oliver could undertake to do the work for £300, except that he had trained men to do it. Was it the committee's opinion that he (Mr. Lynsag) should insist on the work being carried out according to the plans and specification?—Chairman: Yes.

**Newtownbarry.**—The Enniscorthy Rural District Council received tenders for the construction of a water supply in the town of Newtownbarry.

**Trim.**—The Board of Guardians of Trim Union will, on 17th February, receive tenders for erecting a small pipe hotwater heating apparatus at the Trim Union Workhouse Chapel. The work to be carried out in accordance with plan and specification prepared by Charles Douglas, Esq., C.E., Rathmolyon.

## HOWTH SEWAGE SCHEME.

The Secretary of the Local Government Board has forwarded to the North Dublin R.D.C. a copy of a letter which they had received from the Board of Trade relative to the sewerage of Howth. On learning that the Local Government Board were prepared to sanction the raising of a loan in connection with the scheme, the letter stated, the Board of Trade would be prepared, so far as the interests of navigation were concerned, to accord their formal consent to the scheme "A" put forward by the Rural Council, provided they were satisfied as to the efficiency of the arrangements for the treatment of the sewage before its discharge into the sea. It should be clearly understood that their consent to the scheme would be subject to their having full power to stop the discharge of the sewage at any time if it be found that a nuisance was created.

Mr. Hannon said they were getting a great deal of blame for the delay in proceeding with the scheme, but really it was not their fault. Mr. McLoughlin and himself had been urging it forward for the past four years, but the Council had been beset by many difficulties. One professional gentleman had declared that the outfall now approved by the Board of Trade would be an unnecessary luxury, but if they accepted his scheme the sewage would be discharged practically in a crude state. The question of the valuation of the land was also responsible for some delay. Meanwhile the poor people in the district were actually starving through want of employment.

## THE MALAHIDE WATER SUPPLY—"WATER AND SEWAGE SCHEME" ADOPTED.

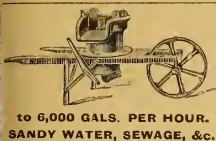
At the last meeting of the Balrothery Rural District Council, the report of the committee appointed to deal with the schemes submitted for supplying the town of Malahide with water was before the Council, and on the motion of Mr. Reid, seconded by Mr. Hogan, it was unanimously adopted. The cost of the "water and sewage" scheme is £6,658.

Mr. R. W. Boyd, the author of the "Water and Sewage" scheme, then came before the Council, and thanked the members for the kind and impartial manner in which he had been treated in the competition out of which he had emerged successfully. Continuing, he said that he considered his scheme a very good one, and one in which, to his knowledge, the estimate was perfectly fair. He could not see that there could be any claim for water rights under the scheme he had prepared. A long discussion then took place between Mr. Boyd, C.E., and the members of the Council, in the course of which many important points, wherein the Councillors were not hitherto quite satisfied with regard to the general merits of the scheme and its working, were explained by Mr. Boyd to the satisfaction of all concerned.

Mr. Boyd promised to have the plans ready for the L.G.B. inquiry within a month.

It was decided to apply for a loan of £7,000.

Assuming the engineer's estimate of £6,658 to be fairly accurate, the sum applied for is, of course, quite inadequate.



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## PETROLITE.

An interesting pamphlet dealing with an entirely new system of lighting has been issued by Petrolite, Limited, whose chief offices are at 106 York road, Lambeth, London, E.C. The publication, which is entitled "A Revolution in Lighting," treats of the patents founded on the inventions of Dr. Hugh Marshall, D.Sc., F.R.S., of Edinburgh University, and Alfred Jaray, C.E., A.M., I.E.E., London, who have succeeded in utilising petrol vapour for domestic and public lighting. Petrol, with which the great growth of motoring has familiarised most people, is an almost pure hydrocarbon which vaporises freely at ordinary temperatures. The vapour resembles coal gas (than which it is purer) in many respects, forming with air a highly explosive mixture, and possessing great illuminative and heating properties. Such being the case it has long been recognised that petrol vapour would prove a valuable illuminant, but the danger of bringing the liquid into proximity with a burner has prevented its adoption. Any lamp, in fact, having a reservoir containing liquid petrol would be to all intents and purposes an infernal machine liable to explode at any moment. The two inventors whom we have named have completely overcome this difficulty by the invention of their petrolite container, consisting of a highly absorbent and incombustible stone chemically prepared in accordance with one of their patents. This stone has vertical perforations to allow for the passage of air, and is fixed in a tin case having an opening and a threaded ring on the top and bottom. As used in the petrolite lamp this stone is filled with petrol, all liquid which is not absorbed being poured off. It is then placed in the body of the lamp, the specially-constructed burner is screwed into it, an incandescent mantle is fitted over the burner, and the whole becomes an incandescent gas-producing and burning plant. It will be observed that there is no free liquid, and therefore no danger. The absolute safety of the lamp has been conclusively demonstrated by the most severe tests carried out by the "British Fire Prevention Committee." During these tests the lighted lamps were repeatedly overturned, and also rolled among shavings, muslin, and other highly inflammable materials. But the lamps simply went out, and every possible means of creating a fire or mishap failed. As to illuminating power, the Petrolite lamp is equal to incandescent gas, and it is claimed that the cost of consumption is less than one quarter compared, light for light, with petroleum at 8d. per gallon. The lamps are manufactured in a great number of ornamental varieties as table, pendant, bracket, and other lamps. They are also suitable for street lighting, and for use in railways, factories, warehouses, and public places. Catalogues and full particulars can be had on application to the company at the above-named address.

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Tenders are invited for the erection of a house at Kingscourt, Co. Cavan, for J. H. Nicholl, Esq., from Drawings and Specification prepared by George F. Beckett, M.R.I.A.I., Architect, 97 Stephen's Green, South, Dublin, copies of which may be seen at the Architect's office, and with Mr. Nicholl, at Kingscourt.

Estimates to be sent to the Architect on or before the 9th day of February.

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#### ENNISTYMON RURAL DISTRICT. TO CONTRACTORS.

Tenders are invited for the construction and completion of a combined Water Supply for the Towns of Ennistymon and Lahinch, Co. Clare.

Drawings and Specification can be seen on application to the Engineer, Brian E. F. Sheehy, Esq., at his office, 57 George street, Limerick, or at the office of the undersigned in the Ennistymon Workhouse any day (Sundays excepted), between the hours of 10 a.m. and 4 p.m. on and after the 13th proximo.

Bills of Quantities prepared by James Mackey, Esq., Surveyor, 58 Dame street, Dublin, may be obtained from him, the Engineer, or the undersigned.

Sealed Tenders, endorsed "Water Supply" (special form to be had from me, the Engineer or Surveyor, no other will be entertained), giving the names of two solvent sureties willing to join in a Bond for the full amount of Tender for the due performance of the contract to be lodged with the undersigned not later than 11 a.m., on Tuesday, the 27th day of February.

A Deposit of £5 must accompany each Tender, which will be returned on receipt of a bona-fide Tender.

The lowest or any tender not necessarily accepted.

By Order,

NICHOLAS GRIFFY,  
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Clerk's Office,

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No. 4—Vol. XLVIII.

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## TOPICAL TOUCHES.

There are said to be six architects elected to the new Parliament. We have not been able to identify them by name.

The report of the Governors of the Dublin Corporation Technical Schools is of the most satisfactory and encouraging character. There were no less than 3,572 class enrolments during the year, showing the large increase of 916. The work done by the students was excellent, the prize achievements being excellent.

The contract for the Irish International Exhibition has been signed, sealed, and delivered, and the actual work of construction will shortly begin. As already noted, in our columns, the preliminary work has been in hands for some time past.

We are glad to see that the Committee have obtained from the contractors a guarantee that local labour will be employed as far as practicable, and that no overtime will be worked until all legitimate demands for employment are satisfied.

Very properly the Committee view with disfavour the prospects of men being attracted from a distance, coming to Dublin and securing employment to the exclusion of the local men, only to be added to the ranks of the unemployed at the conclusion of the work.

At the last meeting the committee had before them the report of the Sub-Committee appointed to consider the estimate submitted by Messrs. Humphreys, Ltd., of Dublin and London, for the buildings and works to be constructed in Herbert Park, and also the report of the Consulting Architects—Messrs. Kaye-Parry and Ross—giving the detailed result of their examination of plans, specifications and estimates, and stating "that Messrs. Humphreys had met their views in regard to designs most readily and fully, with the result that a series of buildings of a most artistic and impressive character and worthy of the city will be erected for the Exhibition."

We are glad to learn that the consulting architects have formed so high an opinion of the artistic merits of the design; it is, however, one not shared by most of those competent to judge, who have seen the designs.

In our last issue we stated that Messrs. Ashlin and Coleman, Architects, had been commissioned to design the new club house for the Portmarnock Golf Club. This was an unfortunate slip, which we very much regret, as the work had been entrusted some time ago to Mr. Chas. H. Ashworth, Archt., of 42 Dame street, whose plans have been accepted by the club. The new club house will be a substantial one storey building, and we are informed that Mr. Ashworth has designed a house which will be eminently suitable to the requirements of the members. The contractors for the work are Messrs. J. and P. Good, of Dublin. The contract price for the work is £3,050. The plumbing and heating contract has been placed with Mr. Baird, of Abbey street, at the price of £700. In addition there will be an installation of acetylene gas, the contract for which has not yet been placed.

We are glad to hear that the Galway Granite and Marble Company will soon have completed the reconstruction of the works which was begun during the past summer. Two new turbines, developing 80 h.p., and the latest turning and polishing machinery capable of handling the largest granite columns, have been laid down, and the whole, when completed, will form one of the largest and most up-to-date granite works in existence.

Meanwhile the work at the quarry close by has not been at a standstill, and, judging from the samples the splendid Shantallow granite, as might be expected, improves in colour and texture as the face is deepened.

Mr. Walter Long, M.P., while Chief Secretary, gave the Company an order for two mantel pieces of the beautiful Connemara marble for his residence in Wiltshire; these have since been delivered, and Mr. Long speaks in the highest terms of their great beauty. They are said to be the admiration of all visitors to his house.

It is also gratifying to learn that this Irish granite has been specified for the Parnell Memorial. This monument, which will be 45 feet high, will be erected at the Rotunda. Granite, polished, chiselled, and hammered will be employed in its construction. The sculptor is Mr. Augustine St. Gaudens, of New York, who was recently honoured by the Royal Academy.

It would have approached the character of an outrage had foreign materials been used for the construction of a memorial to the most notable Irishman of our time.

We trust that the promoters of the memorial to the Dublin Fusiliers will follow the example of the Parnell Committee and not that of the Irish Imperial Yeomanry Committee, who adopted Portland stone and Scotch granite for their memorial to the memory of brave Irishmen.

A great deal of important evidence was taken by the Arterial Drainage Commission at their sitting last week. Many representatives of local drainage boards gave evidence, and spoke from the standpoint of both landlords and tenants, while Mr. A. D. Price, C.E., gave evidence on behalf of the Local Government Board. The general consensus of opinion so far, seems to favour the transfer of control to the County Councils, though some of the landlord witnesses feared that as the landlords at present are liable for the drainage charges, that the County Councils being mainly representative of the tenant class, might not be impartial.

In a letter to the "Independent," Mr. Thomas H. Cruise, an incorporated accountant, deploras the employment of unqualified persons as accountants, he says:—"Physicians or surgeons or dentists are not employed to do legal work, nor are solicitors or barristers asked or allowed to perform surgical operations or to extract teeth. Why, then, should persons who have not been trained, and are not qualified in accountancy or auditing be employed to protect the interests of shareholders in large business concerns and Parliamentary Companies." If he had struck out "accountant" and put in "architect" or "engineer," his letter would be an equally telling argument in favour of statutory registration.



## OUR NORTHERN LETTER.

(FROM OUR OWN CORRESPONDENT.)

ARCHITECTURAL ASSOCIATION OF IRELAND  
JOTTINGS.**The Entrance.**

The "Salon de Musee" at the "Maison de l'Association d'Architecture" has been improved by the removal of some unnecessary obstructions, and visitors can now see right across the room provided they stand in the proper place.

**The Last Lecture.**

Mr. Owen's evening was not attended by large numbers, but it was noticeable that those present represented the cream of the Association. There was no time for much discussion, but the speeches which were delivered had qualities both of intellectual grasp and high ideals.

**One Speaker.**

Mr. Hudman carried his audience with him when he eloquently put forth the view that drawings, specifications, and "quantities" should be correct and full in their description of the work to be done, and that any lack or error should not fall upon the contractor. He characterised the policy which is the basis of the well-known and nearly worn out clause at the commencement of Bill of Quantities, relieving that happy and well-to-do man, the surveyor, from all responsibility, as "dishonest," and asked how the contractor could reasonably be expected to find out in a week (the time usually given for tendering) whether there were any errors in documents which had taken months to prepare.

**The Heating Pipes.**

It is a proof of the interest which Mr. Owen's paper inspired, that his audience did not leave until the end of the proceedings, although somehow or other the high pressure small-bore system wouldn't work that evening, although it is rumoured that the energetic and powerful assistant secretary spent an hour and a half stoking up the boiler.

Another rumour since come to hand, but as yet unconfirmed, is to the effect that there is no water in the pipes.

**The Dinner.**

Let honour be to those to whom honour is due, and let Mr. F. Sparrow and Mr. Page L. Dickenson be put on pedestals immediately. Not only did they do most of the work of organisation and minister to the physical demands of those present, but also pleased and tickled the faculties and sensibilities of the members and visitors with their latest humorous topical production.

**The Board of Works.**

Even the officials of the Board of Works take dinner—and appear to enjoy it too. It is wonderful how the common needs of humanity can mix even the fat, good oil of Government position, and the cold thin water of private practice.

The general opinion seems to be that the dinner was a most successful and enjoyable function, and that it was too soon over. From all indications, musical talent seems to run with architectural genius.

**Contracts Open.**

The Belfast Board of Guardians invite tenders for the following work at "The Abbey" Sanatorium, Whiteabbey, by Belfast, viz.—(a) Erecting four one-storey pavilions, laying water mains, constructing drains, walks, tanks, etc.; (b) erecting a two storied hospital and mortuary, and making additions and alterations to existing administrative buildings. Copies of schedule of quantities and forms of tender can be obtained from Mr. S. C. Hunter, Building Surveyor, Scottish Provident Buildings, Belfast, on payment of half a guinea, not returnable. Plans, etc., can be seen at the Clerk of Union's office, Belfast. The architects are Messrs. Young and Mackenzie, Scottish Provident Buildings, Belfast. Endorsed tenders to be lodged not later than noon on Tuesday, the 6th March.

The Northern Banking Company, Ltd., Belfast, are about to issue to limited competition the building of a new branch bank, at Banbridge, Co. Down; approximate cost £3,000. The architect is Godfrey W. Ferguson, Royal-avenue, Belfast; and quantities have been prepared by Mr. S. C. Hunter, Belfast.

The new scheme for additional water supply to Bangor, Co. Down, will also soon be issued for competition; quantities by S. C. Hunter, Belfast.

Tenders are invited for the erection of a detached villa at Greenisland, Co. Antrim. Plans and specifications can be seen at the office of the architect, Mr. Thomas Houston, Kingscourt, Wellington-place, Belfast, with whom endorsed tenders are to be lodged not later than March 12th.

**Accepted Tenders.**

The tender of Mr. Hutchinson Keeth, Glenravel-street, Belfast, has been accepted for the erection of the new endowed school, Bangor, Co. Down, of which Mr. E. L. Woods, the Town Surveyor, is architect.

**Strabane Technical Institute.**

The Strabane Urban Council, at a special meeting on the 12th inst., adopted a resolution forwarded by the Strabane Technical Committee, recommending that the Council take steps to erect a Technical Institute for the town. Mr. Stuart, Borough Surveyor, has been commissioned to prepare the necessary plans and specification.

**Art in the North.**

The will of the recently-deceased Sir Robert Lloyd Patterson proposes the first substantial endowment of art in Belfast of which there is record. He bequeathes all his pictures, valued at £9,000, to the city, and also the sum of £6,000 towards building a suitable Art Gallery to contain them as the nucleus of a Municipal collection. The bequest will not take effect during the life of Lady Patterson. It is to be hoped that this most generous gift will be an example to be followed by other wealthy citizens, for no city in the Three Kingdoms is so badly catered for in art as Belfast. Signs of awakening and change, however, are not wanting. An important step has been taken in the formation of a Joint Art Committee of the Ulster Society of Architects, the Belfast Art Society, and the Ulster Arts Club. The second is the eldest of the three associations, and has this year attained its majority. Each association contributes four members to the joint committee, elected annually. The first step taken by the committee was an effort to have the Watt's pictures recently exhibited in Dublin brought North but the assent of the trustees could not be obtained to this proposal—Glasgow and Liverpool also failing to secure their loan. Baulked of this, the committee are proceeding to organise a loan exhibition of first class paintings, and success in this is now practically assured. The Corporation have granted use of the existing Municipal Art Gallery—a very insufficient one, it is true, but the best at present obtainable—on the most favourable terms possible. A large guarantee fund is needed, and from the promises already made, is more than obtainable. In fact, the proposal of the committee has "caught on." A considerable number of the pictures recently exhibited in the National Museum, Dublin, and proposed as the beginning of a National Gallery of Art in Dublin, have, through the courtesy of Mr. Hugh P. Lane, been promised to the Belfast Art Exhibition. A few good pictures will also be lent privately. Work of the following artists will be included—Watts, Leighton, Poynter, Val Prince, Corot, Courbet, Whistler, Fautin-Latour, etc. One of the most influential friends of the exhibition movement is Sir James Henderson, chairman of the Literary and Technical Instruction Committee of the Corporation, and proprietor of the *Belfast Newsletter*. Another enterprise which the Joint Art Committee hope to carry out is the establishment of an Art Journal. The chief originator of the committee is Mr. W. J. Gilliland, F.R.I.B.A., the first president of the Ulster Society of Architects. The committee's address is 7 Clarendon-place, May-street, Belfast.

The forest area of Canada is almost incalculably great. Not including Newfoundland and the Labrador coast, it amounts to 1,351,505 square miles, or 865,000,000 acres. Assuming that the entire area will yield 2,000 feet to the acre (a not excessive estimate), and allowing a period of fifty years for cutting right through the forests, there would be an annual output of 35,000,000,000 feet, which is more than the entire present yield of the United States. With judicious forestry regulations a fifty years' cutting period would leave the stand of timber unimpaired in quantity or quality, so that the timber resources of Canada are with careful management practically inexhaustible.

### THE CONDITIONS OF CONTRACT

As Amended by the Council of the R.I.A.I. Dec., 1905.

As our readers are doubtless aware, the subject of the revision of the conditions of contract has been before the Royal Institute of Ireland, off and on, for several years, the matter was in the hands of a committee, with Mr. C. A. Owen as Hon. Sec. The sub-committee have drafted revised conditions which have been approved of by the Council, and will shortly be submitted to a general meeting of the members for adoption. Last week Mr. Owen detailed to the members of the Architectural Association the character and general effect of the revisions.

My object, said Mr. Owen, is to call your attention to, and explain the effect of the various amendments proposed, and the reasons for introducing them. But I think a brief reference to the general history of building conditions and of our Irish conditions in particular, is desirable as an introduction to the subject.

#### The Origin.

The R.I.B.A. issued in 1872 a small document called "The Heads of Conditions of Builders' Contracts," which is now out of print. This document was referred to a special committee with a view to revision in the year 1887, and appears to have been under discussion till 1895, when the "Sohedule of Conditions of Building Contract" of that date was issued under the sanction of the R.I.B.A. These conditions were again under revision from 1898 to 1901, when the edition was issued, which was in use till June, 1903, when the present further revised edition was published.

#### The Irish Practice.

Our Irish Institute has not hitherto issued any set of conditions under its sanction and approval. Some thirty years ago the Architects' Club, acting on behalf of its members, revised the conditions in general use among Irish architects under the advice of two leading counsel. These revised conditions were soon adopted by the profession at large, and since then they have been subjected to many variations on the part of individual architects, with the result that there are numerous differences, verbal and otherwise, between the original and the sets in use in the various offices at the present day.

Being of opinion that it was very desirable, in the interests of the profession in Ireland, to secure uniformity of practice by the issue of conditions of contract suitable to the present requirements of building in that country, the Council of the R.I.A.I. referred the matter to the Professional Practice Committee in January, '03, with instructions to report on the best means of attaining this object.

#### The Considerations before the Committee.

The Committee had before them the following documents:

1. The conditions generally in use among the members of the R.I.A.I.
2. The conditions published under the sanction of the R.I.B.A. in April, 1901.
3. The conditions as proposed by the Dublin Master Builders' Association.
4. The conditions as proposed by the master builders of Belfast and Cork.
5. Conditions of contract relating to building works, by Frank Macey, architect, 1902.

Having carefully considered and compared the above sets of conditions, a majority reported in favour of the adoption of the R.I.B.A. conditions as the basis on which modified conditions should be formed, and furnished a statement of the modifications which they considered desirable.

The Council, after frequent discussion, came to the conclusion that it would be wiser to postpone the proposed adoption of the R.I.B.A. conditions as a basis and the consequent radical changes in practice involved thereby till some years experience had proved their efficiency; and, therefore, in May, '04, the Professional Practice Committee was instructed to prepare a set of conditions based on the conditions in general use among the members of the R.I.A.I.

The Committee accordingly obtained a copy of the conditions in use from eight offices and drew up a revised set which was submitted in November, '04, duly discussed in council and referred back several times for the consideration of further amendments; and, on 5th June, '05, the committee was instructed to submit the amended conditions as provisionally adopted by the council to Mr. A. W. Murray, Barrister-at-Law, for his general settlement and opinion. The committee thereupon drew up and submitted to Mr. Murray the necessary instructions, fully detailing the nature of and reasons for each of the proposed amendments. Having gone into and settled all questions raised by him, the committee submitted the conditions as revised and amended by him to the council in October, 1905, and they were finally approved on December 4th, when the Hon.

Sec. was instructed to send notice to the members that a copy of the revised conditions proposed to be issued under the sanction of the R.I.A.I. could be seen at the rooms in Clare-street.

#### In Regard to Building Contracts Generally.

An ideal set of conditions of contract should provide:

- I. For the execution of the proposed works, as set forth in the contract, drawings, and specification for a fixed sum.
- II. For the protection of the building owner from the effects of damage by fire or other usual contractor's risks, or from improper interpretation of the drawings and specification, improper deviation, improper charges, defaults, and insolvency on the part of the contractor.
- III. For the protection of the contractor from the effects of risks outside those usually undertaken by a contractor, from improper interpretation of the drawings and specification, improper interference during the execution of the works, default and insolvency on the part of the building owner.

#### A Building Contract.

A building contract is not primarily a contract between client and architect, and it should not contain any matter which is not essential and necessary to the formation of a contract between building owner and contractor; such matter is entirely out of place, whether inserted for the protection of client or architect.

#### Critical Study.

Critical study of the various forms of building contract which have been considered by the Professional Practice Committee during the last three years and the frequent discussion of the entire question, from the broadest general principles to minor details, both in Committee and Council, coupled with my own experience in practice, have led me to the conclusion that the most practical and best description of building contract—best, I mean, in the interests of both employer and contractor—is that which places the architect in supreme control, makes him sole judge and his decision final and conclusive in regard to all questions relating to the execution of the works, the meaning of the drawings and specification, the quality of materials, and the nature and quality of the works to be executed, or already executed; while giving the contractor the right of arbitration in the event of dispute as to the quantity or valuation of deviations.

#### What a Contract Does.

Such a contract enables a competent and straightforward architect to get his design properly carried out, together with any deviations that may be necessary, and to ensure that the contractor receives just payment for the work done.

It has frequently been argued that such a contract leaves either party very much at the mercy of incompetent or unscrupulous architects; but an architect's reputation for competence or straightness speedily becomes known, and employer or contractor can protect himself by abstaining from employing or declining to tender under any man of doubtful reputation.

We in Ireland have had such a contract in general use for upwards of 30 years, and it has, on the whole, worked very satisfactorily; a fact which, to my mind, speaks very well indeed for the men who have worked under it.

#### What has Been Done.

I may say that the conditions now presented for adoption are the same in principle as those in use for the last 30 years, but amended in details, and brought up-to-date.

Throughout the revision the original sequence of the various headings and the original wording have been studiously adhered to wherever practicable; verbal and other differences have been reconciled; contradictions have been removed, and the meaning of some clauses, which were indefinitely worded, has been elucidated. The amendments which have been introduced are either necessary to reconcile differences and to elucidate obscurities, or are such as have been found desirable in view of the experience gained in the working of the original conditions during the last 30 years and the changes which have occurred in the building trade in that period.

It would be impracticable here to notice the differences which existed among the eight sets of conditions considered by the Committee, I have therefore followed their example and adopted the set which appears to have been subjected to least amendment, as the basis of comparison between the old and amended versions.

#### The Letter of Invitation.

The letter of invitation to builders has been re-drafted and, though shorter than the old, it contains all that is necessary in such a document. The old letter contains no reference to the conditions of contract under which the



works are to be carried out, therefore, as it is important that both surveyors and contractors shall be conversant with the conditions before measuring or tendering, the first and third paragraphs of the new letter contain references to the conditions (note that it is essential that the conditions be attached to the specification when handed to surveyor or contractor for measurement). In connection with this, I may mention that there is a tendency among surveyors to copy more than is necessary out of the conditions into their bills, thus swelling the charge for lithography to no advantage. All that is necessary is the quantities in a copy of each clause which entails any possible expenditure on the part of the contractor. The provision in the old version for setting aside tenders, if not accompanied by a detailed estimate, or if the value set upon old materials is excessive, has been omitted from the new one, also the clause dealing with the opening and treatment of detailed estimates. The provision in case of deduction from the gross amount has been omitted from the letter because it is included in Clause 10, paragraph 2, revised conditions.

#### The Articles of Agreement.

There were no articles of agreement attached to the old version.

The form now proposed is based on that in use by the R.I.B.A., and does not call for any particular comment. The note at the foot of page 2, old version, containing the names of the parties to the contract and provision in case of the architect's death or inability to act, is omitted, because these matters are contained in the proposed form of "agreement" as distinct from the "general conditions."

#### The Changes, Plans, Specification, etc.

Clause 1 (Old).—Paragraph 1 provides for one set of copies of the drawings, specification and details to be supplied to the contractor by the architects. No change is proposed, but the words "free of cost" have been inserted to remove any doubt as to the contractor's right to be supplied with one copy gratis.

Paragraph 2 provides for contractor making any further copies required and delivering up all copies to the architect, who can withhold his final certificate till this be done, or lost copies accounted for. No change is proposed.

Paragraph 3 provides for signing of contracts, drawings, and carrying out of works in conformity with them and any further instructions, but omits to mention the specification.

The words "and specification" have been inserted to remedy this defect.

#### Conformity with Plans.

Clause 2.—Paragraph 1 makes notes on drawings equally binding as if contained in the specification, and provides for everything being done to complete the works in conformity with what may reasonably be implied by or inferred from drawing or specification.

No change proposed.

Paragraph 2 constitutes any works shown or described only upon the drawings or only in the specification part of the contract works, and, in case of discrepancy between drawing and specification, leaves the architect to decide which shall be followed.

No change is proposed, but a cross reference is added to Clause 13, paragraph 2, new version.

#### Plant, and Employers Property Therein.

Clause 3 deals with plant and the employer's temporary property therein.

The words "in the specification" have been substituted for "hereinafter" in connection with the description of the works, and the word "hereafter" has been omitted. "Hereinafter" and "hereafter" really apply to the specification, and imply that the conditions shall always be attached to the specification so as to form part and parcel of it, a thing neither desirable nor necessary.

#### Setting out Works.

Clause 4, dealing with the setting out of the works by the contractor and his responsibility for errors, has not been altered.

#### Materials; Property Therein.

Clause 5, dealing with work and materials delivered, the employer's temporary property therein, their removal, etc., has not been altered.

#### Defective Materials.

Clause 6, paragraph 1, which provides for the removal of improper materials and the substitution of proper materials is unaltered, save that the words "by the architect" have twice been inserted after "employer" in order to make the procedure clear in case of contractor's default.

Paragraph 2 provides for the removal of work executed with improper materials or defective workmanship and its proper re-execution.

The words "during the progress of the work" have been omitted, because they might be read as limiting the power

of the architect, under Clause 14, to have all defects made good before issuing final certificate. The following has been inserted after the words "substitute proper materials and workmanship," "and he is also to make good all injury to the works, arising from either or both of the aforesaid causes, to the complete satisfaction of the architect; and the architect shall be at liberty to withhold any certificates for instalments on account that would otherwise be due to the contractor until all his requirements have been fully complied with." This insertion renders the contractor liable for any injury to the works as a whole that may arise from the removal and re-execution of improper work and gives the architect the power of enforcing speedy compliance with the contract. Note that in case of default under paragraphs 1 and 2 the employer can, under the new conditions, proceed to take up the works from the contractor under Clause 8.

The words "by the architect" have been inserted after "employer" for the same reasons in paragraph 1.

Paragraph 3, which deals with making good defects during a fixed period after the completion of the works, has been enlarged and strengthened though not materially altered.

The words "shrinkage and other faults" have been omitted as redundant, because the word "defects" covers everything of the kind.

The word "works" has been substituted for the word "building," because it is a more general term, and every contract is not necessarily for a building. It will save time hereafter if I here remark that the words "works, buildings, etc.," have been used indiscriminately throughout the old version, sometimes in reference to the works which are the subject matter of the contract, sometimes in reference to the contract itself. Throughout the new version the word "works" has been used in reference to the subject matter of the contract, and the word "contract" in reference to the contract itself.

Paragraph 3 the words "defects arising from neglect to protect from the weather" have been inserted. Though this was probably implied by the old version it was considered wiser to have it directly stated.

The last two lines have been re-drafted. I., to enable the architect to allow the contractor part of the cost of making good defects, he being the sole judge of the amount to be allowed; because the old version, read literally, permits all or nothing of said cost to be allowed; and

II., to state definitely that, in case of default, the employer may make good defects and may recoup himself from the retention money. The old version might be read to mean that he could recover the cost by an action at law.

The fourth paragraph of this clause has been omitted entirely, and paragraph 2 of Clause 4 has been strengthened to include its provisions, in so far as they are desirable.

#### Protection from Weather.

Clause 7, paragraph 1.—This paragraph, which provides for protection from the weather, might be read to mean that the contractor was not bound to protect unless directed by the architect to do so, and then only in the manner directed by the architect.

The paragraph, as re-drafted, throws on the contractor the onus of proper protection, and gives the architect power to have this done in case of contractor's default.

Paragraph 2, dealing with exclusion of time, owing to suspension of works caused by weather, etc., is unaltered.

#### Completion.

Clause 8, paragraph 1, providing for the works being completed within a specified time and for penalties in case of delay, has been re-drafted into three paragraphs. Paragraph 1 provides for possession of the site being given to the contractor on a certain day, for the works being immediately commenced and regularly proceeded with to completion by a certain date. Paragraph 2 provides for a penalty per week as liquidated and ascertained damages in case of delay in completion and giving up possession to the employer. Paragraph 3 provides for extension of time. The principal difference between new and old is that the employer is bound to give the contractor possession by a certain date, the works are to be proceeded with regularly, possession is to be given up to the employer on completion, extension of time is to be allowed for in case of delay arising from disputes, etc., with neighbouring owners or from the works or delay caused by other contractors or tradesmen by the employees and not referred to in the specification, and contractor is to give the architect notice of strikes, etc., and is to do all that may be reasonably required by the architect to avoid delay arising from strikes, etc.

Clause 8.—Paragraph 2, dealing with the state of the works on completion, has not been altered. It becomes paragraph 5 in the new version.

Clause 8.—Paragraph 3 has been omitted as redundant in view of the provisions of Clause 14.

Clause 8.—Paragraph 4, which deals with procedure in case of suspension or delay in carrying out the works, has been re-drafted, because it is not sufficiently definite in regard to procedure, and because many desirable provisions are wanting.

The following are some of the points in regard to which the old paragraph is indefinite or deficient:—

It is not definitely stated that the architect can call in a surveyor at contractor's expense. The principle of the old paragraph has not been changed by the amendment of these defects, but an alternative mode of dealing with a defaulting contractor has been added. For the sake of convenience the old procedure has been called course A, and the alternative course B.

Stated briefly, the new paragraph provides that, in case of suspension, improper delay, and non-removal of defective materials or work, the architect shall certify, in writing, that any one of such defaults exists, and that the delay or suspension is not due to the weather or to strikes, etc., and then the employer may serve notice on the contractor calling on him to proceed with the work with such diligence as will satisfy the architect that it will be done up to time, and, after this notice contractor cannot remove any plant or materials. If the architect is not satisfied at the end of the expiration of the notice, or if at any future time the architect is not satisfied, the architect shall so certify, and thereupon the employer can either proceed under course A or adopt course B. Note that up to this point the procedure is the same under both courses. If he decides to proceed under course A, the employer can take possession of the works and exclude the contractor entirely, except that the contractor or one man on his behalf must be allowed in to inspect, survey, or measure the works and any deviations. The employer can act on his architect's advice as to the best mode of completing the works without undue delay or expense, and he can employ men, by contract or otherwise, and use the plant and materials on the site for this purpose. The architect can, if he wishes, call in a surveyor at the contractor's expense. When the contract is completed, that is, when all defects have been made good at the end of the period stated in the conditions, the architect is to certify the expenses properly incurred owing to the default of contractor and the completion of his contract by other persons, and the sum so certified is to be paid by the contractor to the employer, or set off against any money due contractor. The employer is not liable to any charge for proper use of the plant during completion. The employer may require the contractor from time to time, before and after completion, to remove any plant and materials that have not been used, and, if they are not removed in reasonable time, he may sell them and credit the contractor with the nett amount received for them.

If the employer decide to adopt course B he may, after serving notice and the architect certifying as before, give six days' notice to the contractor stating that he intends to terminate the contract, and call on him either to meet the surveyor on the ground and check measurements or send someone on his behalf to do so. After the notice contractor cannot remove materials or enter the works except to check measurements. The surveyor measures up any works and materials that the architect considers to be in accordance with contract, also any sound and suitable plant, and the value of such work, materials, and plant is ascertained in the usual way under Clause 10. The surveyor furnishes a copy of his measured bill to the architect and contractors, the architect certifies, and the employer pays on production of the certificate. If architect and contractor cannot agree as to any prices, contractor can call for arbitration, but the employer can proceed to complete the works after the measurement is finished. The contractor pays the surveyor.

#### Deviations

Clause 9, paragraph 1.—This paragraph defines the meaning of the word deviations. The definition now reads: "All alterations by addition, omission, or variation from the work," etc. The word "drawings" has been substituted for "plans," and "or either of them" has been inserted after "specification." Read literally, the old paragraph only applies to alterations in the work as set forth both by plan and specification, and not at all to work on elevations, sections, etc., or to work shown separately on either plan or in specification.

I may here remark that throughout the old version the words "extra, variation, addition, omission, deviation" are used quite indiscriminately, and that throughout the new version the word "deviation" has been substituted wherever reference is made to alterations by addition, omission, or variation.

Paragraph 2.—This paragraph, which deals with alterations which do not involve additional cost, has been re-

drafted, and all allusion to such alterations has been omitted, because they do not require special mention, provided the contract gives the architect power to make any alterations at all. The provisions of paragraph 4, Clause 6, which give the architect power to make deviations during execution for the purpose of facilitating the work or other good and sufficient reason, have been introduced into this clause; also, the power, for same reasons, to sanction deviations already made without his knowledge, and to make due allowance for any difference in value. This gives a proper architect all the power that he needs to enable him to do what is right. It is to be noted that paragraphs 2 and 3 of Clause 9 in the old version, give an architect full power to make alterations and to sanction alterations made without his knowledge, and this covers all matters contained in paragraph 4, Clauses 6 and 8. The "substitution of a description of material or workmanship different from, or less costly than that specified, or, if any material or workmanship be found executed without his sanction of a quality, or in a manner inferior to what is specified, to permit such to remain, etc." Why then mention these matters twice unless one paragraph, the 4th of Clause 6, were intended to protect the architect against his clients' dissatisfaction, and the other, Clause 9, to protect the employer against the contractor's introducing extras! Be that as it may, I am credibly informed that the Courts have more than once held that under paragraph 4, Clause 6, the client could not recover damages against an architect, though his brother architects could see no good and sufficient reason for the deviations which he had sanctioned. I hope and believe that the new paragraph 2 will give us architects all the protection we ought to have, and that it will hold us harmless against complaints on the part of our clients, so long as, in the opinion of our brother architects, we have good and sufficient reason for the deviations we sanction.

Paragraphs 3 and 4 in the old version are badly arranged. Paragraph 3 forbids contractor to deviate from contract without an order, and provides for day work, two subjects in one par. Paragraph 4 states that contractor will not be paid for unauthorised extras, and provides for his furnishing a statement of any works which he considers to be extras when applying for certificate. Here also there are two subjects, and one of them is referred to in paragraph 3.

The new paragraph 3 contains the parts of 3 and 4, which refer to the execution of and payment for authorised extras. Day work is provided for in paragraph 4, and furnishing statements in paragraph 5.

The new paragraph 3 is almost a copy of the first sentences of paragraphs 3 and 4, but it does not contain the provision that the contractor is not to deviate or execute any extra works, etc., unless upon the authority of the architect by order in writing, etc., or upon his subsequent written approval.

#### Day Work.

New paragraph 4 provides that day work prices shall only be allowed when the architect is of opinion that the work cannot properly be measured, that the contractor shall give notice of the commencement of such work and the number of tradesmen and labourers on it, and also of any changes from time to time. Time and material sheets to be made up weekly, signed on behalf of contractor and architect, and to be produced to the architect to enable him to arrive at the value of the works so executed, and only work authorised to be so done will be allowed for as day work.

The new paragraph 5 corresponds with the provision in old paragraph 4, but the words "unless the contractor obtain the subsequent written approval of the architect" have been added to prevent the appearance of contradiction between this paragraph and paragraphs 2 and 3. A cross reference to Clause 14, paragraph 4, calls attention to a new provision for contractor furnishing an approximate statement of the work executed when applying for certificate.

#### Schedule of Price

Clause 10.—Paragraph 1 deals with pricing deviations according to the detailed estimate. The words, "shall form the basis for calculating," are substituted for "be the values of all, etc."

Paragraph 2 provides, when deviations are being valued, for the reduction of each rate in detail in cases where it appears that, when tender is being made out, reduction has been made in the gross total or in any section by percentage in order to bring it down to the contract sum. The words "addition" and "increase" have been inserted for the purpose of making the paragraph cover an increase of each rate in detail in cases where it appears that an addition has been made to any total to bring the amount up to the contract sum.

This is only fair on both parties to the contract. Under the old provision, when a reduction had been made, the



contractor was paid less pro rata for extras and the employer was allowed less for omissions; but when an addition had been made the contractor was not allowed more pro rata for extras nor the employer allowed more for omissions.

Paragraph 3, which provides for items to which the schedule does not apply or cases where there is no schedule, has only been altered by substituting the word "rates" for "prices" in the last line.

Paragraph 4.—This paragraph empowers the architect to employ a surveyor to check or measure up any statements of extras furnished by the contractor from time to time, which shall be admitted to be extras. The new paragraph extends the measurement to any works admitted to be omitted or altered from time to time, *i.e.*, to all authorised deviations.

Old paragraph 5, dealing with the payment of surveyor, has been added to paragraph 4, and provides for the surveyor being paid by the employer.

I may here remark that throughout the revised conditions the party whose conduct necessitates the employment of a surveyor has to pay him. In the present connection, it is the employer or his architect who causes the deviations, and therefore the employer pays.

#### Arbitration.

Clause 11, paragraph 1.—The arbitration clause has not been altered in principle. It has been in use for more than thirty years, and has proved thoroughly satisfactory in working. This is more than can be said of any other such clause which has come under my notice; some of them make it possible to insist on arbitration over trifles such as the quality of the timber in a door; some, like that of the R.I.B.A., seem fated to be struck out of contracts by the mutual consent of architect and contractor in order to keep clear of law suits.

#### Keep Clear of Lawsuits

The old paragraph perfectly suits cases where a surveyor has not been employed to measure up deviations; but, in cases where the architect has, previous to dispute, called in the surveyor to measure up under Clause 10, paragraph 4, it is necessary, in order to comply with the literal meaning of the paragraph, to send the surveyor to measure up a second time. This anomaly has been remedied by making the sentence read, "the architect, if he have not already done so under Clause 10, paragraph 4, shall have power to name a building surveyor (read to 'if either party shall object') thereto," is the old reading, but "object to any of the quantities or prices therein," has been substituted for the sake of clearness (read to "a single architect") has been introduced to enable the parties, if they so desire, to submit the disputed items to one architect as sole arbitrator (read to "said surveyor's account"), has been inserted for clearness, and (read to "items therein which are"), for the same reason (read to "objection") in the old version, but "parties failing to agree" has been substituted, because the parties may have come to an agreement on the items objected to (read to "on the production of") has been substituted for "within one week after" (read to end of sentence) (read last sentence). This is a new provision, and only just to the contractor.

Note that under the provisions of paragraph 4, Clause 10, and paragraph 1, Clause 11, the surveyor's account, or, if no surveyor be employed, the account made out by the contractor is final and conclusive on the employer in respect of all items therein which are agreed to by the architect and contractor, and that the architect's certificate for such amount must be paid.

Paragraph 2.—No change is made in the party paying the surveyor.

#### Clerk of Works.

Clause 12, paragraph 1, deals with the architect's power to appoint a Clerk of Works. No change has been made.

Paragraph 2, dealing with the book in which the contractor is to enter all authorised deviations; also measurements for same if made by the Clerk of Works. "In conjunction with" is substituted for "conjointly."

Paragraph 3 provides that contractor's liability shall not be altered by the appointment of Clerk of Works. There has been added, "He shall be, etc.," which makes the provision more complete.

#### Architects Control.

Clause 13, paragraph 1, gives the architect the right of access at all times to the works, which are to be entirely under his control, and provides for dismissal of objectionable workmen. No change.

Clause 13, paragraph 2, is really a detailed statement of what is meant by the works being entirely under the architect's control. For clearness, the various matters in respect of which his decision is final have been distinguished by numerals in brackets [1] "the execution of the works,"

[2] "the meaning," with the addition of "and inferences to be drawn from" the "drawings and specification." This insertion brings the provision into line with the words "inferred from" in Clause 2. [3] "The manner of the execution of the works," [4] "the quality of the materials," [5] "the nature and quality of the works already executed." Note that the word "quantity" has been omitted from this sentence in the new version. In the old version Clause 11 made the decision of the arbitrator final in regard to the quantity of works executed, and Clause 13 contradicted it by making the decision of the architect also final. [6] "The nature, quantity, and quality of the works to be thereafter executed" has been introduced in order to give the architect the power to decide at any time what works shall be executed. This retains the obvious intention of the old version while removing the contradiction. [7] The word "amount" has been omitted from the last line as tending to limit the scope of the architect's decision.

#### Payments.

Clause 14.—Paragraph 1.—This paragraph, which deals with certificates and payments, has been re-drafted, because the old one is deficient or indefinite in regard to—

1. The amount of interim certificates (left to discretion).
2. The liability of employer to pay certificates promptly.
3. The minimum amount of certificate required by the contractor.
4. An equitable reduction, agreed on before signing contract, in the amount of money retained as security (drawback) for the due completion of the contract after contractor has completed the works, and during his period of liability to amend defects.
5. The date at which contractor's liability to make good commences. (See Clause 6, paragraph 3.)
6. The necessity of contractor giving up possession at the commencement of the period of liability.
7. The date at which the architect should give final certificate.
8. The completion of the works, the subject of the contract, and the completion of the contract itself.

The new paragraph has been drafted to meet the above defects. It provides that the contractor shall be paid within 14 days of the date of all interim certificates, such certificates to be issued for blank, say, 90 per cent., of the value of work executed when, in the opinion of the architect, work to the value of blank, say £100, has been executed in the building, or, at his discretion, when less has been executed, *i.e.*, contractor cannot insist on getting certificate for less than an agreed sum, but the architect can certify for less in his discretion. After the balance retained in hands amounts to a certain sum agreed on before signing all interim certificates are to be for the full value of work on ground. Note, that for clearness the word "interim" has been used to describe all certificates issued during the progress of the works. Paragraph continues, "when the works are, in the opinion of the architect *prima facie* complete, and when possession has been given up to the employer, etc." The difficulty in clearly defining the date of the commencement of the contractor's liability to make good, which, of course, coincides with that of completion of works, has been met by providing that the architect shall write the words, "Works *prima facie* complete" on the face of the interim certificate which he is bound to issue when he believes that the works are "*prima facie*" or to all intents and purposes complete, provided that contractor has handed them over to the employer. But the issue of this certificate is not to be taken as an admission that all works have been completed, nor does it absolve the contractor from liability to execute anything that may not have been done at the date of this certificate. Under this certificate the contractor receives an agreed proportion, say, one half, of the sum retained in hands, in addition to any sum that may be due to him at the time on account of works executed since the last certificate. Note that the certificate of "*prima facie* completion" is an ordinary interim certificate, except that it is so marked in order to fix the date at which the contractor's liability to make good shall commence; note also that there is nothing in the whole clause to prevent the architect issuing other interim certificates between the dates of completion and final certificate.

The architect issues final certificate for the balance, *i.e.*, the remaining portion of the sum retained in hands—months after the certificate of *prima facie* completion, or as soon after such period as the contract shall have been completed by all defects-being made good to his satisfaction.

The old paragraph seems to take it for granted that the architect will know the total cost of the job at the date when the works are complete. At any rate, it binds him to give final certificate at that date, and the period of amendment

then commences. This is how I read paragraph 3, clause 6, and paragraph 1, clause 14, and it is the only way to make them agree. Well, you are all painfully aware that, in most cases, the surveyor has not, sometimes cannot, complete his measurements, price them, and deliver his account to architect and contractor before the works are complete, much less can architect and contractor go into the account before that date, so the only course open to the architect is to break the contract by not issuing final certificate at the date of completion, and by making the period of amendment commence from the date of completion instead of from date of final certificate.

This gives rise to other difficulties, which would take too long to go into; but you may take it from me that all are met by the new paragraph 1, under which the architect writes the words "Works prima facie complete" on the face of an ordinary interim certificate bearing the date at which he believes this to be the case, and for such an amount as he feels safe in certifying, plus the portion of the drawback agreed to be handed over to the contractor at the date of prima facie completion of works. When the total sum payable to the contractor in respect of the job becomes known, the architect issues an interim certificate, the amount of which, added to the amount of former certificates, will leave in hands the sum agreed to be so held from the date of completion of works to the date of final certificate. For instance, suppose a contract for £20,000, a percentage to be held back till the money in hands amounts to £1,500, after which the certificates are to be for the full value of work on ground. It is agreed that £1,000 of the drawback shall be paid at date of certificate of prima facie completion, and the remaining £500 twelve months afterwards, or later, depending on whether defects have been made good. The deviations have been large, and at the date of completion the surveyor has not finished his work. Under these circumstances the architect issues his certificate of prima facie completion, adding £1,000 to whatever sum he feels safe in certifying at that date. If three months afterwards the total cost is ascertained to be £21,000, he issues an interim certificate, the amount of which added to the amounts of former certificates, comes to £20,500, leaving £500 to be covered by his final certificate.

Paragraph 2, which forbids contractor to ask for any payments except on certificates, and for the amounts named therein, has not been altered.

Paragraph 3 has been strengthened by prefixing the words "neither the giving of certificates nor the making of payments" to the provisions empowering the architect to recall and modify, as may be necessary or proper, his last or any certificate before signing the final one. No other change has been made. This paragraph is important, because by clearly giving the architect power to modify the amount of any former certificate, it prevents any interim certificate from being read as stating the agreed value of the works, or any part of them, at any particular time.

Clause 14, paragraph 4 (new paragraph).—This is frequently done without being included in the contract, and is a most useful provision.

Paragraph 5 is new. It protects the contractor in case the employer does not pay sums certified, or becomes bankrupt, or the works be stopped for blank months from any cause. It provides that, if contractor is not paid within blank days after notice given, or if employers' trustee cannot show within blank days of notice his ability to carry out the contract and make payments, or if the works be stopped for blank months, contractor can determine the contract and recover from employer the value of the work executed and loss sustained on plant and material. The amount to be ascertained under the provisions of Clause 8 Course B., i.e., in the same way as in the case of termination of contract by employer.

#### Insurance.

Clause 15, which deals with insurance, is unaltered, save that the insurance office is to be approved by the architect; and the omission of the words "upon request" makes the production of the policies and receipts to the architect part of the contractor's duty under the contract.

#### Responsibility for Damages.

Clause 16, paragraph 1.—Contractor's responsibility to make good injuries, damages, and repairs from fire, etc., and to hold employer harmless for claims for injuries to person or property arising from default of his employees has not been altered, except that the word "structural" has been omitted as limiting the application of the word "damages," and "continuance of the contract" has been substituted at the end for "execution of the works," because such damages might have to be made good after the certificate of prima facie completion.

Paragraph 2 is new. It has been inserted to hold the em-

ployer harmless against any claims for injury to workmen under various Acts of Parliament.

#### Employer's Right of Access.

Clause 17 gives the employer free access to the works, and permits him to send workmen to the premises to execute works not included in the contract. "To" has been substituted for "upon," because in the old version, "send workmen upon the premises" might mean sending men who are already there. The words, "the execution of" have been inserted in the last line after "occasioned by," because it is not the works themselves, but their execution that is likely to cause damage.

#### Contractors' Bankruptcy.

Clause 18.—This clause is identical with Clause 8, paragraph 4, Course A., except that provision is made against any action being brought by the trustee before the architect gives his final certificate.

Counsel was asked whether it would be possible to adopt Course B. instead of Course A., and make bankruptcy give the employer power to measure up the works, pay for what has been done, and get rid of the Court entirely, but he replied to the effect that the Bankruptcy Court would not recognise such a clause, because the creditors have the right to any profit that may be obtainable under the contract. This is a pity from the employers' and architects' point of view, because official assignees know nothing about building matters, and are only anxious to get out of the completion of building contracts as cheaply as possible regardless of the quality of the work done.

#### Sub-letting.

Clause 19.—Sub-letting is unchanged.

#### Provisional Sums.

Clause 20, paragraph 1.—The old clause dealing with provisional sums and P.C. is obscurely worded, and wanting in some important provisions. It has been redrafted with a view to providing for

1. Sums specifically allocated to certain objects.
2. Sums or general provisions to be applied, at the discretion of the architect, for additional works.
3. All the foregoing sums to be paid by the contractor, without discount or deduction, in the amounts and to the persons directed by the architect or to be paid by the employer.
4. For ascertaining the value of works executed by the contractor in connection with the execution of specific works, such as making good plaster, etc., etc., or the value of works executed with sums left at the discretion of the architect to be expended on additional works.
5. Payment for same including contractor's profit.
6. Damages paid to the contractor by any sub-contractor under this Clause to be the property of contractors.

The P.C. provisions have been put in paragraph 2, and a clear definition of the words, "Prime Cost" has been added.

Paragraph 2 becomes paragraph 3. Its provision of 15 per cent. allowance on excess of deductions, except provisional sums, over additions, is not altered.

#### Notices, Licences, etc. (new clause)

Clause 21, dealing with notices, licences, and adjoining premises is not in the original version, though many architects have introduced such a provision.

#### Conformity with Acts of Parliament (new clause)

Clause 22.—The same remarks apply to this Clause, dealing with conformity with Acts of Parliament, bye-laws of local authorities, and of Power and Lighting Companies.

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## CORRESPONDENCE.

## APPOINTMENTS UNDER LOCAL AUTHORITIES.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR SIR,—Under the above title, "Free Lance" tilts rather erratically in the current issue of the IRISH BUILDER.

I cordially agree with "Free Lance" in his opinion that clerks of works, or those superintending the erection of buildings and other structures, should be well qualified for the purpose. But why blame or reflect on those unqualified persons who seek and obtain these appointments? The persons at fault are those who elect such unqualified persons, and if the Local Government Board approves of such appointments, then it becomes the duty of the engineering and architectural professions to bring the matter under the notice of that Board. If this were done, I believe that the Board would do that which is fair and just to all parties.

With permission, I will now touch on the other phases of "Free Lance's" letter.

"Free Lance" sneers at a handy mason or carpenter. I always was, and am, of opinion that it is better to be a handy artificer than an unhandy one. I may be wrong.

Telford started life as a stonemason. Rennie, after a short career as a schoolmaster, devoted himself to mechanical work.

Brindley, uncultured to his end, started life as a millwright. George Stephenson, of locomotive fame, started wage earning by minding cows at 2d. a day.

These "creatures" became engineers of exceptional ability. Might I ask "Free Lance" a question?

All right engineers and architects beyond suspicion as regards professional ability? I have my own opinion, which might, perhaps, surprise "Free Lance," but I emphatically repudiate any intention of reflecting on this able and honourable class.

The class gratuitously insulted and libelled by the latter part of "Free Lance's" letter can very well afford to treat the matter with the contempt which it merits.

I have found contractors as a class to be as honest, honourable, and able as one could wish.—Yours truly,  
16th February, 1906. DE SILVA.

## THE ART AND CRAFT OF PLASTERING.

TO THE EDITOR IRISH BUILDER AND ENGINEER.

SIR—I read with great interest your article under the above heading. Mr. Millar's work is well deserving of your notice, as it is an invaluable work, not alone to plasterers, but to architects and builders, as a book of reference. I myself was one of the guarantors for the publication of the first edition, and am not a bit surprised at its having reached the third. However, it is not so much the book I intend writing about, as you have done more in that respect than I am capable of. No, sir. It is to challenge a statement made by you to the effect that all the decorative plastering in Ireland was "mainly the work of a colony of Italians." I know from past experience that you are always prepared to extend the courtesy of your columns, even though one may be bold enough to differ with you—that is, if the matter is of general interest, which I claim this to be.

As the statement is generally accepted as being correct, and no credit ever given to Irish plasterers for any work done in the old days, I shall point out a few facts which will prove conclusively that others besides Italians had a share in what is so often pointed out to us as examples that we are incapable of copying. Now, sir, that decorative plastering emanated from Italy after the Renaissance, and that the Italians were the pioneers of this, as well as other forms of art all over Europe, we all know. That some artists, as they were called, were brought first to England and sometime afterwards a few to Ireland, is also the fact. But, it was only on isolated jobs they were employed, as very few buildings suited the style of Italian decoration. The lofty and spacious halls and ballrooms alone suited their elaborate style. The idea of plaster decorations soon began to be copied, but the comparatively small and low rooms of the English and Irish mansions required an entirely different treatment. Your illustration of a ceiling in Lord Montalt's mansion is a splendid example of this particular form of decoration.

This ceiling was by G. Richardson, 1775, and is nothing like Italian in style, neither was Richardson an Italian. Then there were the brothers Adams, Inigo Jones, Sir Christopher Wren, and many others not Italians, and all having their own particular styles. These are the styles that mostly obtained in Ireland, and are entirely different from the work of Italian artists. According to Millar two brothers named Clark were brought from Dublin to do artistic work at Somerset House in 1783. Well we must have had some good men to spare when we could send them to England.

In 1640 a Royal Charter was granted to the Plasterers of the Guild of St. Bartholomew, Dublin, that is another proof of having good men in Dublin at an early period. There is a very important matter also for consideration, and that is, the difference of the materials used by the Irish plasterers and the Italians in doing handwork. The Irish used no plaster, their materials were lime and sand, while the Italians hunt their own gypsum and made plaster which they used as we do now.

Unfortunately, it is impossible to collect exact names, etc. for a great many jobs, but, on the authority of the oldest living member of the trade (W. Spencer, sen.), I give some names who did work in the early part of the 19th century. A family named Crowley did the Round Room, Rotunda; the Smyth family the Pro-Cathedral, Marlborough-street (a worthy descendant of this family is Mr. George Smyth, the eminent sculptor); the Darcys, who did the last handwork job in Dublin, Lord Iveagh's, Stephen's Green; the Buckleys, Rathmines R.C. Church; the Siblans, Hogans, M'Naspies, etc. None of these were Italians, and have left samples of work second to none.

I hope, Mr. Editor, I have proved to your satisfaction that the statement I complained of is not altogether one of fact, and that our forefathers held their own in the art of plastering as they did in many other artistic callings in days gone by. I beg to thank you for mentioning my name as one who is trying to revive the grand old trade.—Yours, etc.,

JOHN RYAN.

The Irish Fibrous Plaster Depot,  
28 Upper Abbey-street, Dublin,  
February 19th, 1906.

## TO THE EDITOR IRISH BUILDER AND ENGINEER.

SIR—In an article on the Art and Craft of Plastering, published in the issue of February 10th, and in which I take exception to that portion wherein you state—

"Trades unions have more or less stamped out artists, and even good workmen, in the plastering trade, and that they actually will not allow their members to work for a master plasterer."

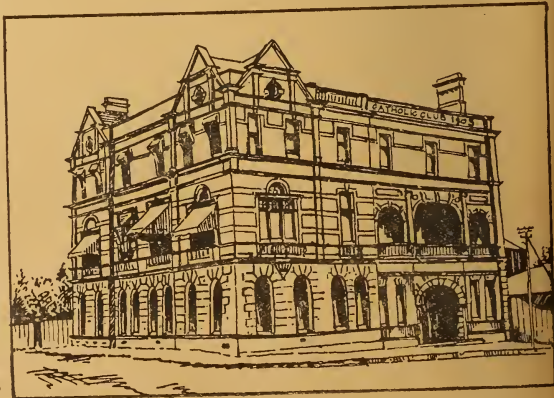
Now, sir, as the grandson of a Dublin plasterer, and with thirty years' experience at the plastering trade, and a life-long member of the Plasterers' Society, I beg to contradict that portion of your article by stating such is not a fact, but quite the contrary.

For over ten years the Plasterers' Society was an annual subscriber to your paper, but when it changed hands and became a capitalist rendezvous, it was time to withdraw our support. Since then attacks have been made on our Union through the columns of your paper which we have treated with the contempt which they deserved; but this last libel we could not allow to pass without contradiction.

By publishing this letter in your next issue you will oblige.—Yours respectfully,

PATRICK MALONE,  
Secretary Operative Plasterers' Society.

According to a correspondent in the *Pall Mall Gazette*, the number of empty houses in London promises before long to reach 60,000. This represents a loss of £500,000 a year in rates, which loss will have to be made good by levying an average rate of 2½d. over the metropolitan area.



THE CATHOLIC CLUB, JOHANNESBURG.

Mr. John Beardswood, Architect.

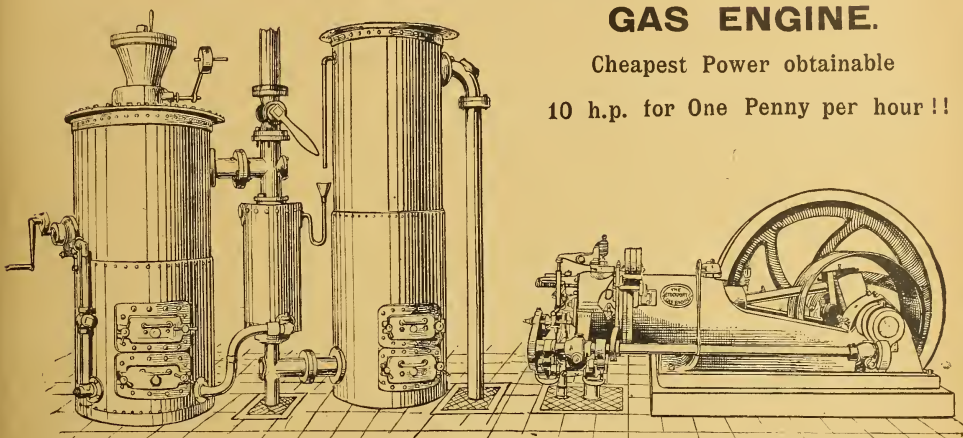
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HIGH COURT OF JUSTICE (IRELAND).—CHANCERY DIVISION.—MASTER OF THE ROLLS.

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## MINTO HOUSE.

## How Plans and Details were Prepared 100 Years Ago.

Minto House, near Hawick, the Scottish home of the newly-appointed Viceroy of India, possesses a number of interesting features. The architect's name has been lost, though an old volume of the original plans of the house exist. These are neither signed nor dated, but are curious as showing the manner in which the working plans for a large house of about 130 years ago were prepared. The drawings are to the scale of  $1\frac{1}{4}$  in. to 10 ft., with a few elevations of the sides of rooms, and plans of ceilings to  $\frac{1}{4}$  in. scale. On the same sheets as the scale drawings, and sometimes on the back, are drawn in a scratchy ink-line full-size details of cornices, balustrades, Ionic caps, etc. For a classic house the plan is unusual, being an L plan with a segmental portico partly filling the re-entering angle. This portico admits into a hall, on either side of which, and running the reverse way, are subordinate halls. The main hall again opens at the end into a circular hall containing a stair, and surrounded on the first floor by an arcaded gallery giving access to the bedrooms and bedroom corridors. On ground floor the circular hall opens on the one side into a large library and on the other side into an interesting octagon drawing-room with lofty coved ceiling. The interior, though not containing any works of art of remarkable importance, has that atmosphere which only generations of refinement can give. Since the return of Lord Minto from Canada the house has undergone extensive alterations and additions under the supervision of Mr. R. S. Lorimer, A.R.S.A., of Edinburgh. Electric light has been installed throughout, the house has been heated, a large number of bathrooms introduced, and the kitchen and service wings of the house rearranged and rebuilt. Outside, an extensive sloping lawn has been altered and formed into a terraced garden with some balustrades and steps.—“The Builders' Journal and Architectural Record.”

## TRENTHAM HALL, STAFFORDSHIRE

It is stated that the Duke of Sutherland is about to present his seat in Staffordshire to the County Council for the purposes of a technical college. The mansion was built in the earlier half of the XVIIIth century after the model of Buckingham House, St. James' Park, but was considerably altered and improved by Holland for the first Marquis of Stafford (*obit* 1803). Subsequent improvements upon an extensive scale were carried out by Sir Charles Barry, who refaced the cemented brickwork of the exterior, added the cornice and balustrades and the belvedere tower, and greatly embellished the details of the old building which contained the reception-rooms. Barry added also the grand entrance-hall and the semicircular corridor giving access to the state-rooms, designed the wing containing the private apartments, and, laying out the gardens, effected a notable transformation of the house and its surroundings. Trentham Hall is identified with the “Italian Palace” described in “Lothair” by Lord Beaconsfield, and its beautiful park, extending over 500 acres, watered by the Trent, is a favourite resort of holiday-makers from the districts around. Launcelot Brown laid out the greater portion of the grounds; his work at the house was superseded by that of his relative Holland—confer Watt's *Seats*, etc., 1779, and Ackermann's *Repository*, 1824.—*The Builder*.

From our general observations, as well as from inquiries which we have made, it is clear that the building and allied trades in Dublin are at present at an unprecedentedly low ebb. There has been within the past few months a number of failures in the city of small builders and timber merchants, and it is feared that the worst is not yet over. All the trade societies report an unusually high percentage of unemployed members, so that the drain on their funds for out-of-work allowances is very severe. As a sign of the times, it may be mentioned that the machinery of two of the largest saw-mills in Dublin will be offered for sale about the end of the present month.

## LAW UNION AND CROWN INSURANCE CO.

At the Annual General Meeting of the Law Union and Crown Insurance Company, held on the 21st inst., the report of the directors for the year ended 31st December, 1905, was submitted and unanimously adopted. New life policies were issued during the year for £861,940, yielding in premiums £30,742. The total income of the life department for the year was £566,750. The claims, which were well within the expectation, amounted to £283,286. The life assurance fund now stands at £4,687,248. The rate of interest earned was, after deducting income tax, £4 os. 10d. per cent. on the mean of the year's funds whether invested or uninvested. The net fire premium income for the year was £213,578, the losses were £81,242 or 38.03 per cent. on the premium income; and the expenses including commission, bonus to staff, etc., £73,514 or 34.42 per cent. of that income, leaving a profit balance of £58,822. In the accident department the premiums for the year were £11,061, and the losses and expenses £6,998, leaving a profit balance of £4,063, which has been carried forward, increasing the amount at credit of the accident account to £17,270.

The profit and loss account, after payment of dividend and debenture interest for the year amounting together to £59,780 11s., adding £31,100 to the Fire Reserves, and applying £5,000 to found a Staff Pension Scheme, showed a credit balance of £127,487, which has been carried forward. The total funds of the Company have increased to £5,556,683. A dividend was declared at the rate of 6s. 6d. per share free of deduction for income tax.

The manager for Ireland is Mr. W. C. Pickeman, whose offices are at No.'s 46 and 47 Dame street, Dublin, and Ulster Bank Buildings, Belfast.

## OUR ILLUSTRATION.

We publish as a supplement to our present issue a perspective drawing of a new villa residence which has been lately built on the Shrewsbury Road, Donnybrook, for Dr. Frederick L. Flood, from the designs of Mr. Henry J. Lundy, M.R.I.A.I., architect, 38 Dame-street, Dublin.

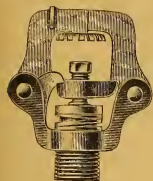
The house we illustrate is one of the largest on this favourite road of charming villa residences, and is faced on the ground storey with Portmannock bricks above a base course of granite ashlar, the upper portion being cement plastered, and finished with fine Kilkenny gravel worked into the finishing coat with a hand float, and is roofed with Peake's brindled red roofing tiles. We are, unfortunately, unable to give a plan showing the internal accommodation, which includes a full-sized billiard room on the ground floor level.

The builders were Messrs. Whelan Brothers and Byrne, who carried out the contract in a satisfactory manner. The bills of quantities were prepared by Mr. J. Graves Clayton, surveyor, 8 Nassau street, Dublin.

## A TRADE CHANGE.

Messrs. Aston Bros., Ltd., advise us that their branch office at Ocean Buildings, Belfast, has been discontinued, and their North of Ireland business will in future be conducted from 38 Donegal-street, Belfast. They have made arrangements to continue the business, carried on at that address by Messrs. Smith and Parkes, under the management of Mr. F. Walford Parkes. In addition to the contracting business hitherto carried on by Messrs. Smith and Parkes, they will carry a representative stock of mechanical and electrical supplies.

Women are daily encroaching more and more on the avocations hitherto supposed to be consecrated to mere men. The latest male occupation to be invaded is that of clerk of works, a woman having recently acted in that capacity at Blackburn. The Princes Theatre in that city, which was re-opened last week, was rebuilt by direct labour engaged by the proprietor, Mr. Page. His daughter, Mrs. Clarkson, has filled the role of clerk of works during the reconstruction, exercising general supervision over the workmen, and paying them their wages.



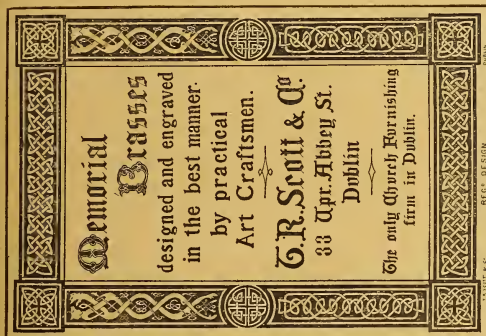
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in the full assurance that these conditions, as now drafted, represent the minimum of what is essential to the intelligent framing of a modern building contract. It would be manifestly unfair, as the result of a mere perusal of the new conditions, to criticise in detail the results of the prolonged labours of the Committee, especially as the matter is, so to speak, sub-judice, pending adoption by the general body of the members, more especially as no one is bound to adopt these conditions save at his own free will. The Committee have devoted an enormous amount of time and attention to this vitally important question, and for that alone deserve the gratitude of their fellow practitioners throughout the country; nevertheless, it may well be, that without undervaluing the work of the Committee, that when the conditions come up for discussion, a way may be found, while retaining the changes and improvements made, to reduce and modify the redundancy of the older clauses. We cannot help feeling that the shorter and more terse such conditions are the better for all concerned, the chances of disagreement being minimised.

At the meeting of the Architectural Association, at which Mr. Owen gave a dissertation on the conditions, the audience represented only the architects. It seems to us to have been rather a pity that this opportunity of inviting some representative contractors, and of hearing their views in a friendly and informal gathering should not have been availed of. The only member present who expressed the builders' views in any way, was Mr. T. E. Hudman, and he confined himself mainly to a vigorous denunciation of what he termed the deliberate dishonesty of surveyors refusing to assume responsibility for their work, and advocating the inclusion of the quantities as part of the contract. This latter point, of course, is really quite a different issue, and one that has often been debated under its own head of "Should quantities be part of the contract?" and does not here so immediately concern us. We are with Mr. Hudman to a considerable extent in his protest; theoretically, surveyors most undoubtedly should guarantee the accuracy of their work; but there is another side to the question, that surveyors occasionally remind us of, namely, that the drawings they get to measure from are sometimes imperfectly thought out, or even carelessly and obscurely prepared, contradictory, and impracticable, that the specification is on occasion full of padding and stock pattern verbiage, and discloses a lack of practical grasp of the subject dealt with and an inability to describe it clearly, simply, and so as to be understood of the ordinary man. Very often it does not exist at all, in which case some architects compel the surveyor to write it for them, thus doing their work; while others again will not permit him to write it, but start off, after all is finished, quantities issued and priced, to write a specification in order to enable a contract to be entered into, probably without even a conference with the surveyor, and often items are included that the surveyor never anticipated. We are not saying that this is a common case, but such things undoubtedly have occurred, as surveyors have told us. Architects, too, are constantly blamed for their dilatoriness—and occasionally with some degree of justice we fear it must be admitted. Very often the drawings have been months in hand—delayed until the client's patience nears vanishing point—they are hurriedly finished, handed over to the surveyor with the intimation that the tenders must be in that day three weeks, or even less; that means, if the job is one of any size, that the surveyor in order to leave the builders an all too short week or ten days for pricing, has to complete three weeks of his own work into about one. We mention such an instance as this simply to show that

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## THE NEW CONDITIONS OF CONTRACT.

In this issue we publish a paper by Mr. C. A. Owen, which sets forth in much detail the changes that the Council of the Royal Institute of the Architects of Ireland have recommended to be made in the general conditions of contract that have been in use for the past 30 years or so. As is generally known, the Institute have had this matter under consideration for several years, and they have now drafted revised conditions, which they will shortly offer to the members for general acceptance.

The old conditions, on the whole, worked very well during these 30 years, despite the fact that its clauses are very verbose, and at times tautological, obscure, or inconsistent with each other; and it always seemed to us, in common with many others, inconceivable that the same ideas could not have been equally, clearly, and, perhaps, more effectively expressed in much fewer words. The longer such conditions of contract are, or the more obscure or doubtful their intentions are, the greater the chances of dispute, and the larger the field for crafty lawyers to read into their terms intents that were never in the minds of their framers.

We had hoped that the Committee would have been able to substantially reduce the bulk of these lengthy conditions. We regret they have not only found themselves unable to do so, but have added substantially to the bulk. The professional practice committee have had the matter under consideration for so long a period of time that it must be assumed that they have weighed the matter with great deliberation, and have made this recommendation,

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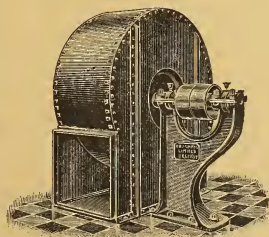
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when architect and builder join in condemning the surveyor, they ought to try and put themselves in his place, and view the question from his standpoint also. But the Architectural Association will soon change all that, and a generation of young architects will arise, purged of every defect, and models of all that should go to constitute the ideal designer, zealous for his work, verily "designing in beauty and building in truth!" Until that millennium arrives we cannot expect perfection in all things.

But this is a digression. We desire not to criticise the conditions as submitted, but simply to express a few thoughts that possibly may lead to some further consideration or discussion tending to still greater perfection.

We are sorry to find moreover that the "articles of agreement," as distinguished from the "general conditions," are not alone retained but amplified beyond the customary terms. We believe it is undoubtedly confusing to have two documents; they should be combined in the one instrument.

Another thing that should be borne in mind is, that the old conditions, although gradually coming into more general use, never at any time found anything like universal acceptance with Irish architects, the majority of whom each have their own forms. The most common practice, we believe, was to embody with the specification a few clauses much less ample than the Institute conditions; but, on the other hand, the articles of agreement are fuller and occasionally inconsistent with the "conditions." We can recall one such instance. In the general conditions there was the usual arbitration clause, in the articles of agreement, while it was set forth that the work was to be performed under the terms of the general conditions, it went on to say—almost in the same breath as it were—that in the event of any dispute or misunderstanding arising between the parties on "any matter touching or arising out of this contract," then such dispute was to be "left to the sole determination and award of the said architect whose decision should be final, binding, and conclusive."

Such a dispute did arise, and a serious one at that; the matter was referred for advice, on behalf of the architect, to one of the ablest leaders of the Irish equity bar, and he unhesitatingly declared the arbitration clause to be imported into the contract. We were curious enough to desire to unravel the history of this inconsistency. It was as follows: the articles of agreement had been originally drawn up by a lawyer for the purpose of another contract, to which there were no general conditions, and adapted time after time by the architect without legal assistance, until finally it was used in the case of which we speak, in conjunction with general conditions.

As drafted, the new conditions seems to follow rather closely upon London practice, where the methods of work are widely different and infinitely more complicated than is the case over here. The clauses relating to the employment of surveyors are somewhat wanting in clearness. Clause 13, making the architect's decision final, is a little in conflict with the arbitration clause, and Clause 14, which gives the architect the right to "recall" his certificates, seems to us, speaking as laymen, ultra vires.

These, of course, are all matters which will no doubt be fully discussed by the members later on.

A correspondent, who was present at the meeting of the Association, sends us a set of general conditions, which he has just adapted from the old Institute conditions, by simply striking out words and clauses that he considered either implied as necessary elements in the work of building—such as the clause relating to scaffolding and plant, and clauses or sentences that he considered repetition or

contradictory. He claims that these conditions contain all the essential parts of the original, and that they gain by their brevity. We purpose publishing them in an early issue, but before doing so, we intend submitting them to legal scrutiny, so that we may be able to offer an opinion with greater certainty. We shall also publish a form of agreement, which was previously lent to us, but is hardly co-related to general conditions, and, we fancy, is intended to act as the sole instrument of contract; likewise we shall publish a form of tender. We note the Institute Committee have not drafted a form of tender; in our opinion, a most useful and important document.

We invite discussion of the whole principle of contracts, particularly in regard to the proposed revision. We should like, too, to hear the views of contractors, as to what practical value they put upon the arbitration clause, and how they would regard a proposal for its total abolition, or do they rather look upon it as a valuable safeguard for their interests.

The whole subject is one of the utmost importance to all concerned, for nothing tends more to smooth easy working than a clear, well-defined and equitable contract; and, needless to say, if such a form could be generally adopted, and therefore well understood in all its terms, so much the better.

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## COMMENTS.

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### Village Halls and Libraries.

In responding to a warm vote of thanks for his delightful paper, entitled "Some rambles with a camera," read before the Architectural Association this week, and which we shall publish in our next issue, Mr. P. J. Lynch, M.R.I.A.I., touched upon a most important subject, not alone to architects, but to the nation at large, namely the provision of parish or village halls throughout the country towns and villages of Ireland.

Mr. Lynch has been a member and staunch supporter of the Association since its inception, and this year generously offered to the students a substantial prize for competition, for the best design for a village hall and library.

Mr. Lynch has during his long official career had exceptional opportunities of becoming well acquainted with the social wants of the country, and he declared the other night that there was no more serious want than such institutions. He was enthusiastic on the subject, and with some knowledge of rural and urban Ireland—north, south, east, and west—we are heartily with him. As he said there is no greater want. It is all very fine to preach abstinence to poor labouring men in country towns, when the only alternative to their cheerless, and oftentimes, cold, dirty, and insanitary home, is the public-house. Such buildings need be only of the simplest character, suited to the needs of the particular town or village, but it must be far more than a mere library, it must partake of the character of a social club for working men, and women, too; there should be a hall for lectures and meetings, rooms for billiards and games, a reading room, and in the larger towns, whenever circumstances permitted, facilities should be provided for men, if they were so disposed, to improve their minds. Refreshments should also, if possible, be provided, and a counterpoise to the attractions of the public-house provided.

This is no new problem, but Mr. Lynch directed attention to it in an eminently practical fashion.

The offering of this prize to the students may be productive of good results by stimulating their minds towards a solution of the structural problem. In the larger towns,

where funds permitted, such halls ought to be standing object lessons in good taste, by being models of simple, unaffected modest design and decorative treatment, free alike from eccentricity and that vulgar display so characteristic, unfortunately, of much of our Irish decorative work.

Mr. Lynch's own paper described, with the aid of the lantern, a charming rambling holiday of his in Devonshire, Cornwall, and the Islands of Scilly.

#### The Art and Craft of Plastering.

We publish in this present issue two letters criticising our remarks on the late Mr. Millar's work on Plastering. The first is from our esteemed correspondent, Mr. John Ryan, than whom there is no one in Dublin better qualified to speak on any matter connected with the craft of plastering. We fear that Mr. Ryan has, however, somewhat misunderstood our remarks, or, possibly, we did not convey ourselves as clearly as we ought to have done. We never intended to suggest that all the old Dublin ceilings were the work of Italians, still less that plastering was an unknown art in Dublin until their advent.

As Mr. Ryan himself points out, the whole character of the detail is absolutely different from pure Italian work, and in most instances was plainly influenced by the designs of the brothers Adam. That plasterwork had in Dublin reached a very high level of excellence long before the importation of Lord Portarlington's Italians, is proved by the existence of the wonderful ceiling of the Royal Hospital at Kilmainham, which belongs to a much earlier period. Indeed, not alone in plaster work, but in stone carving, cabinet-making, and other crafts, Dublin, during the eighteenth century may be said to have had a most important school of its own, whose workers did admirable work, as an inspection of the stone frontispieces of some of the fine old Dublin mansions of the day prove; while a visit to the Science and Art Museum shows what the cabinet makers of Dublin could do in those days, and, for the matter of that, can still do. What we did intend to convey was that the introduction of a band of Italians by Lord Portarlington was a stimulus to, and had a marked influence upon Irish plaster work. It is a matter of historic fact that these Italians did live and labour in Dublin, and, that being so, it is obvious that their presence must have had good effects. Besides this, of course, all art of the renaissance period was cradled in Italy, and the preponderating influence of Italy upon renaissance art for all time cannot be got away from. There was no such thing as an absolutely native style in any country of Europe once the middle ages had passed.

In our remarks Mr. Ryan forgets we did actually mention Richardson as the designer of ceilings we illustrated, and we expressed doubt as to his nationality, supposing him to have been an Englishman, as he worked for the Curzon family in Derbyshire about the same time as for Lord Montalt in Dublin; possibly following Mr. Ryan's suggestion he may have been an Irishman whose fame had spread to England. Certain it is that although Richardson is an English name, there have been Richardsons settled in the County of Dublin for at least two hundred years, which would rather lend colour to this supposition.

The second letter which we publish is from the Secretary of the Plasterers' Union. We are sorry we have fallen foul of the plasterers. We have no wish to quarrel with any trades union, and notwithstanding that Mr. Malone describes this journal as the "rendezvous of capitalists," we gladly publish his letter, and shall at all times be only too pleased to afford the publicity of our columns to him or to any other unionist. We learn for the first

time from his letter that the Plasterers' Society once subscribed to this journal, and subsequently ceased to subscribe. The IRISH BUILDER, now in existence half a century, has changed ownership five times, but its policy has remained the same, namely, an absolutely independent criticism of all that pertains to the arts, crafts, and sciences connected with building and engineering matters. We have criticised the trades unions when we thought criticism called for, and we are sorry they have taken it so ill. If they can show us where we are wrong we shall recant. We are glad to learn from Mr. Malone's letter that operative plasterers are now permitted to work for master plasterers. Such was not, we believe, always the case, and can Mr. Malone pretend that the reduction of every man to the same dead level of wage and status, the prohibition of one man being encouraged beyond his fellows, and the regulation as to apprentices, whereby their number is artificially limited, are all calculated to promote the highest ideals of craftsmanship? Mr. Malone must know they do not, and that the average craftsman of to-day has less initiative and inventive skill than his forefathers of the eighteenth century, and is tending more and more to the rank and position of a cog in the "general contractor's" wheel. We shall be glad to publish the views of any other of our readers.

#### DUROLITE, LIMITED.

In the advertisement pages of our current issue will be found an abridged prospectus of the above company, which we would commend the notice of our readers. The company has been formed for the purpose of carrying on the manufacturing of glass, tiles, pottery and earthenware, and acquiring the undertaking of the Duro Decorative Art Company, of London, and St. Helens, Lancashire. Duro-lite is a speciality well known to our readers.

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The Company also specialise in leaded lights and stained glass for domestic, ecclesiastical, and other purposes to which ornamental glass is applicable. Their latest and most successful production is painted figured rolled glass, for which it is understood there is already a large demand. This is produced in one, two, or three colours, and the effect is both novel and artistic, and has only to be seen to be appreciated.

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## THE IMPROVEMENT OF THE PORT OF DROGHEDA

The following is the text of the very important report upon the Harbour of Drogheda, recently made by Mr. John Henry Ryan, M.I.C.E., the engineer appointed by the Harbour Board. The scheme outlined will involve an outlay of not less than £130,000:—

12th February, 1906.

To the Harbour Commissioners, for the Improvement of the Port of Drogheda.

GENTLEMEN,—

Agreeable to the resolution passed by your Board and communicated to me by your Secretary on the 16th November, 1905, I have examined into the past and present condition of the Port, with a view of ascertaining what improvements may be effected so as to render the Port accessible and the river navigable at all stages of the tide.

I have to acknowledge the valuable information given me by the Manager and the Engineer of the Lancashire and Yorkshire Railway Company, who kindly furnished me with a copy of their map showing soundings recently taken by them. It is generally admitted by the ship masters, pilots, and others navigating the port that the bar at present existing at the mouth of the river is extremely dangerous at neap-tides, having only 13½ feet at high water (the L. and Y. steamers draw 12½ feet, leaving only 1 foot to spare), and with even a moderate easterly breeze, there is always danger of vessels striking the bar. At low water the average minimum depth is about five feet.

I concur with the opinions expressed by all the engineers who have reported to your Board on this subject, also by the shipmasters, pilots, and others that the work which stands foremost for execution is the removal of this bar.

In designing work for this purpose, the object sought should be to strengthen the ebb current so that it may prevail over the flood; to push out the line of travel of material along the shore so far that it crosses the outfall in deep water where the strength of the littoral current is sufficient to prevent its being carried into the channel by flood tide; to increase the depth of water at the outfall so as to neutralise the action of on shore gales and breaking waves. I have also to bear in mind the large volume of expert opinion from owners of vessels of the United Kingdom, and from owners of all the fishing vessels along the east coast as to the necessity of a harbour of refuge. The works proposed will, therefore, have to be so designed as to meet these twofold requirements. I therefore recommend that jetties of training walls of rubble stone be constructed and carried out to deep water on both sides of the river for directing the current, and so placed and constructed as to produce the greatest effect from the tidal scour, together with being erected of a sufficient height so as to afford shelter to vessels making the port during stress of weather, and for approaches to the lighthouses at end of each wall.

I propose to effect these requirements by the following works:—

The training wall or jetty already existing on the north side from nearly opposite the Maiden Tower to the North Bar perch, to be raised to a height of four feet above high water, and a similar training wall or jetty extended eastwards from this to the two fathom line about 1,000 feet at the same height and terminating with a solid concrete structure; that the training wall already existing on the south side from the Maiden Tower towards the South Bar perch be also raised to a height of four feet above high water, and a training wall or jetty extended eastwards to the two fathom line about 2,000 feet at the same height, and also terminating with a solid concrete structure, leaving the entrance to the river 1,000 feet wide. These walls or jetties to be composed of rubble stone obtained from quarries adjoining the river above Drogheda, which material will be barged down the river on the ebb tide and deposited on the sites.

The terminal works at the end of the walls to be carried down to the solid clay, which has been ascertained to exist at a depth of 13 feet below Ordnance Datum: on each of these solid terminal works, I propose that lighthouses be erected with suitable lanterns, fog signals, and such other fittings as may be found necessary.

The existing lights, or such of them as the Irish Lights Board may deem unnecessary, can then be discontinued.

The next work which should claim attention is that of improving the facilities for navigation of the river, so as to admit of vessels safely approaching and departing the quays at Drogheda at all stages of the tide. To attain this object I consider that the present natural conditions of the river do not afford sufficient depth for its navigation, as the channel is obstructed by bends, which exists between the North

and South Crook, between Baltray and Morningson and at Beaulien Points.

I propose, therefore, that a new curved channel be cut to the south of these bends, viz., from a point near and opposite to Queensborough in an easterly direction to a point between South Crook and Maiden Tower, also that the bend at Beaulien Point be eased, as indicated in red on accompanying plan, and to be of sufficient width and depth so as to admit of the largest vessels likely to trade with the port to pass each other with safety, also extensive dredging of the remaining portions of the old river channel will be necessary to obtain the requisite depth; the channel so improved will fulfil one of the principal conditions to be observed, namely, that the tidal wave should be propagated to the furthest limit practicable in one deep uniform channel, in which the tidal water is made to concentrate its energy to the fullest extent.

The river channel so improved, together with the large existing tidal area will always ensure a sufficient volume of water to scour the bar and maintain a depth to admit of navigation at all stages of the tide, and I anticipate thereby that the present accumulation being removed, in future little, if any, dredging of the bar will be required, and, in fact, I am of opinion that eventually it will be found that the proposed improvements of the channel will cause the tide water to have a longer, deeper, and more concentrated flow, and thereby compensate for any abstraction of any tidal water from the estuary, and should it be found so, reclamation of the slob lands can be carried out, thereby considerably increasing the revenue of the port. Suitable beacons will be erected on both sides of the channel to direct navigation.

The estimate of the above mentioned works will be approximately as follows:—

ESTIMATE.		Cub. yds.			
North Wall, Rubble	..	143,666			
South Wall, ..	..	108,734			
		252,400			
Two Lighthouses	..		4/-	50,480	0 0
Cutting New Channel and easing angle of existing Channel. Excavation	..	924,552	1/-	2,000	0 0
				46,227	12 0
				£98,707	12 0
Engineering Law	} 25 per cent.			24,676	18 0
Contingencies				£123,384	10 0
Deepening River by Dredging so as to give 24 feet of depth at High Water, and at least 12 ft. at Low Water		450,000	3d.	5,625	0 0
				£129,009	10 0

I am, Gentlemen,

Yours faithfully,

(Signed) J. H. RYAN, M.A., M.Inst.C.E.

## IMPORTS.

## PORT OF DUBLIN.

February 8, per Lily Garton, from Paisley, 115 tons bricks, R. Brown; per Henry, from Bristol, 143 tons free stone, E. Glanville.

February 14th, per Lady Hudson-Kinahan, from Loo don, 800 sacks cement, T. Dockrell, Sons and Co.; 3 air kins lead, S. H. Bolton and Sons; a quantity of marble, E. S. Glanville; a quantity timber, J. Kiernan.

February 15th, per City of Belfast, from Gheent, 9,725 bags cement, to order.

February 16th, per Thelma, from Goheborg, 26 cases glass, 7 bags turned wood, 2,700 bundles laths, 7,590 pieces, 4,430 bundles boards, to order; per Lady Martin from London, 720 sacks cement, J. Johnson; 595 do., do. McDowall.

February 17th, per Velinheli, from Port Dinorwic, 100 tons slates, T. and C. Martin, Ltd.

February 19th, per Catherine Latham, from Chester, 125 tons bricks, T. and C. Martin, Ltd.; per Elizabeth Hyam, from Chester, 100 tons bricks, T. Archer.

February 20th, per Renown, from Belfast, 230 tons bricks, McCracken; per Appleby, from Bridgwater, bricks and brickyard goods, J. McCferan and Co.; per Rose, from Bridgwater, 150 tons bricks, T. and C. Martin, Ltd.; 2 boxes do., J. Kelly and Son; per Lilla, from Bridgwater, 115 tons brick goods, W. and L. Crowe, Ltd.; per Lady Olive, from London, 600 sacks cement, J. Johnson; a quantity ironwork to order.

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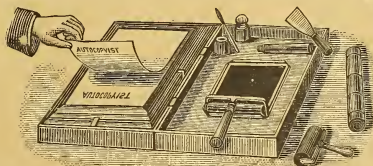
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**Ballyshannon.**—The Ballyshannon Rural District Council considered applications from architects for carrying out the professional work in connection with an improvement scheme under the Labourers' Acts.

**Ballinrobe.**—Tenders will be received by Mr. John Ritchie, C.E., Architect, Ballinrobe, up to the 28th inst., for the erection of new Post Office in Market street.

**County Cork.**—Lombardstown Co-operative Society, County Cork, invite tenders for the erection of large additions to premises.

**Clicnes.**—The Rural District Council have appointed Messrs. J. and J. Smith, Keeranmore, architects, on terms of their former appointment, to carry out the cottage scheme.

**Castlecomer.**—A NEW TOWN HALL.—There is a report current that Mr. Wandesforde, J.P., D.L., has decided to erect a new Town Hall in Castlecomer.

**Dalkey.**—The Dalkey Urban District Council will, on 5th March, 1906, consider tenders for the erection of three one-storey cottages on their plot at Carysfort-road, Dalkey.

**Derry.**—At the Corporation meeting last week, Councillor J. McCarron, when the report from the Parks and Libraries Committee was before the Council, wished to have some explanation of the protracted delay in commencing the construction of the Carnegie Free Library in the Diamond. The matter was extremely pressing in view of the fact that many masons and joiners in the city were at present out of employment. Alderman Bell replied that Mr. M. A. Robinson was going on with the preparation of the plans for the free library as fast as he possibly could. Councillor McCarron—How long more will we have to wait? Alderman Bell—The plans must be ready before anything can be done. The Mayor—Will they be ready soon? Alderman Bell—In about a week.

A correspondent of the local Press calls attention to the fact that the Corporation has determined on a new technical school, a public free library, increased water supply, and better cattle market accommodation; and the money is available for all those purposes.

**Donegal.**—Tenders were considered by the above Council for painting and repairing the Courthouse at Carnadonagh.

**Dublin.**—At the last meeting of the Dublin Trades' Council a resolution was proposed by Mr. Lyons condemning the recent strictures of Mr. Cowan, Local Government Inspector, on the clauses of the Corporation contracts protecting local workers, as "an unwarranted intrusion by a public servant on the rights of the people's representatives, and as subversive of the principle of local government," and calling the attention of his superiors to his actions, as being incompatible with the conducting of impartial inquiry. The resolution was agreed to unanimously. The Secretary was requested to send copies of the resolution to the Prime Minister, the President of the Local Government Board, and the Lord Lieutenant.

Messrs. Cunliffe and Dillon, building contractors, have been successful in securing the contract for the rebuilding of Mr. T. Heagney's licensed premises, North Wall.

**Gortin.**—Tenders will be received to-day, 24th inst., for alterations and improvements to Ruskey R.C. Chapel, Gortin, County Tyrone, according to plans and specification prepared by Mr. J. P. McGrath, Architect, Commercial Buildings, Foyle-street, Londonderry.

**Mountmellick.**—The District Council invite tenders for the erection of nine labourers' cottages. Tenders will be considered to-day.

**Navan.**—An advertisement appears in our columns to-day inviting tenders for the erection of a new Banking Premises for the Belfast Banking Company, Ltd. Sealed tenders must be delivered to Anthony Scott and Son, Architects, 34 Lower Sackville-street, Dublin, not later than 2nd March, 1906. The quantities have been prepared by Mr. James Mackey, Surveyor, 38 Dame street, Dublin.

**Rathdown.**—The No. 2 Rural District Council will, on the 28th inst., elect a competent man as clerk of works, at £2 10s. per week, and six inspectors, one for each of the six breaches on the public road from Bray to Enniskerry, at £1 1s. per week each, the salary to be paid every two weeks by the County Surveyor.

At the same meeting the Council will consider tenders for the completion of a pair of labourers' cottages on the townland of Monastery, near Enniskerry.

**Swinford.**—Tenders are invited for the renovation of the old premises of the Provincial Bank, Swinford. Tenders before the 3rd March to Joseph S. Cairns, C.E., Ballina.

**Sligo.**—NEW MILLS IN SLIGO.—Interest along the quays for some months past has been largely centred in the new mills being constructed for Messrs. Harper Campbell, Ltd. They have decided upon having their new premises erected in Hennebique's Ferro-Concrete, a system whereby Portland concrete is strengthened by use of a steel skeleton, or network of steel bars, which combines great strength with lightness of design, and the very important factor of absolute resistance to fire. They were mainly induced to have this method of construction by the fact that it is now being largely adopted for most of the new mills, granaries, and warehouses, building, or recently completed, in England and on the Continent. The contract for the building was secured by The Yorkshire Hennebique Contracting Company, Ltd., of Leeds, as until recently no firm of Irish contractors had obtained a licence to work under M. Hennebique's patents. To ensure, however, that the necessarily very large expenditure in wages should benefit local workmen, Messrs. Harper Campbell, Ltd., inserted a special clause in the contract that local labour was to be employed as far as possible. The main building has its front facing the Deep Water Embankment, and consists of four floors over the basement. From ground level to the parapet of the flat roof its height will be 66 feet, and an attic, extending over portion of the roof, containing elevator heads, etc., will be 10 ft. higher. The entire building, from foundation to roof, including floors, beams, and pillars, is constructed in Ferro-Concrete. It is divided into three sections—corn-receiving and storage department, and the milling and meal storage and delivery portions, all communications between these sections being protected by double fireproof doors.—The question of power for driving machinery is always of paramount importance, and after mature consideration and inspection of various plants both in England and Ireland, Messrs. Harper Campbell, Ltd., decided upon a Horizontal Tandem Compound Condensing Engine of the most up-to-date design as being the most economical and suitable. The steam for this will be produced by a double-flued or Lancashire boiler working in conjunction with a Green's Economiser—a series of pipes arranged in the main flue for utilizing the waste heat passing to the chimney shaft to heat the feed water for the boiler. This plant is installed in a separate building, also of Ferro-Concrete, with a Ferro-Concrete tank roof having a capacity of 20,000 gallons of rain water collected from the roof of the main building. The rear portion of the site is occupied by a large reservoir with a capacity of half a million gallons. The chimney is being erected by the Alphonse Custodis Chimney Company on their patent principle of perforated radial blocks, combining strength with lightness and gracefulness of design. It is a circular shaft 30 feet high from ground level, of which 15 feet are an octagonal base. This firm also executed the contract for the special boiler seating and flues, and also the engine bed and foundations. It is interesting to note that this is only the second chimney of its kind in Ireland at present, the first having been built last year for Messrs. Harland and Wolff, the great shipbuilders of Belfast. Plans for the building were prepared by Messrs. Thomas Robinson and Son, Ltd., the well-known milling engineers and furnisiers, of Rochdale, Lancashire, and were adapted to the Ferro-Concrete system by Mr. L. G. Mouchel, C.E., of London, agent in Great Britain and Ireland for the patentee, M. Hennebique, of Paris; and the work is being carried out under the supervision of Mr. W. F. Gilchrist, C.E., of Sligo. The mill will be equipped with the most modern machinery, and will have a complete installation of electric light.

**Wicklow.**—Tenders were received by the Wicklow Urban District Council for the construction and erection of a new roof and other works at the Market Hall, Wicklow, in accordance with plans and specification prepared by Mr. J. Pansing, Town Surveyor.

We are sorry to see that at the last meeting of the Corporation an attempt was made to revive "the battle of the sites" in connection with the new technical schools. However, we are glad to see this attempt was defeated, and a more practical proposal to enlarge the Bolton-street site carried.

# ENGINEERING SECTION.

## ITEMS.

We cannot resist the following, from the pages of the *Tufton Street Tailor*, a bright little magazine issued by some members of the English A.A. It will appeal doubtless to engineers and architects in this country:—

Mistress (to maid who has just been engaged)—“Well, Jane, what is your young man?”

Jane—“Please, mum, ‘e’s a harchi-tec, mum; not one of them as *lays* the bricks; ‘e carries ‘em hup.”

The refuse destructor at Swansea is giving the greatest satisfaction. The plant consists of five standard backfeed cells, with a total grate area of 210 square feet, and, as is usual with modern installations of this type, it is fitted with patent hot blast arrangements with steam jets, patent front exhaust flues, and special feeding and clinking doors. A Lancashire boiler, 30 feet by 8 feet 6 inches, is provided, having a working pressure of 180 lbs. per square inch, and the chimney is 120 feet in height. In connection with the destructor, a set of clinker crushing and screening machines has been erected, and also a mortar mill and engine. The electrical machinery has also recently been installed, the substation being under the control of the borough electrical engineer. It contains one 225 Kilowatt British Schuckert dynamo, coupled direct to a marine triple expansion open type engine, by Messrs. J. and H. MacLaren, of Leeds, running at a speed of 150 revolutions per minute, and capable of developing 450 I.H.P. This machinery operates a route of electric tramway  $\frac{3}{4}$  miles long, the steam being provided solely by the destructor boiler, which has, however, a small furnace as a stand by. The average quantity of refuse dealt with during the month of November, 1905, amounted to 60 tons 9 cwt. per day, and on one day of that month the engine ran for 14 $\frac{1}{2}$  hours and produced 1,285 electrical units without any coal consumption.

In this connection, a recent paper by Mr. F. L. Watson, read before the Civil and Mechanical Engineers' Society, is of some importance. He summarised in a very lucid fashion the various directions in which destructor by-products can be utilised. The first of these is naturally heated gas, which is available for drying sludge or other materials, and, as in the case at Swansea, for the generation of steam for driving mechanical and electrical machinery. It has also been used for heating the water in municipal baths and wash-houses. Clinker is, of course, the chief residual product, and we have from time to time given in our columns examples of its transformation into mortar and concrete flags and blocks for building purposes with highly satisfactory results. An example of the utility of clinker was most practically demonstrated at the Garden City Exhibition at Letchworth last year, where Mr. John Brodie, M.Inst.C.E., of the Liverpool City Engineer, designed and erected a cottage, consisting of five rooms, scullery, and out-offices, at a cost of £150, the walls, floors, and roof of which were entirely constructed of concrete slabs of destructor clinker, slightly reinforced with steel. The principal adopted in the construction of each room in the building is that of a dovetailed box, in which each of the four sides, the floor, and the ceiling is made of one concrete slab, reinforced as stated, and made in a mould. After maturing, the slabs are conveyed to the site and erected in position. According to his statement, the time of erection would be from three to six days subsequent to the completion of the foundations.

Whilst this method could only apply to the cheapest form of houses, otherwise the economy would not be effected, the clinker can be turned to the most profitable use by making bricks on the Schultess system. The weight of clinker lime bricks, so made, is stated to be about three tons per 1,000, and from tests made by Professor Goodman at Leeds University, the crush strength would appear to range from 110 to 185 tons per square foot.

Another residual product which is now collected in the centrifugal dust catcher is the flue dust, which can be utilised to a certain extent in plaster work and as a basis for disinfecting powder. It is a curious fact that, with the solution of the problem of refuse destruction to their hand, and the economies which can be effected and the power obtainable from a properly designed plant so fully proved, municipal authorities throughout the country, in so many instances, remain wedded to the expensive and insanitary methods of sea and land tipping respectively.

It is interesting to note that, in the last month of 1905, there were 1,484 tons of Belgian cement imported into Dublin, as compared with 463 in the same period of 1904, and it behoves all architects and engineers to be watchful that this cement is not utilised in lieu of that of the firms in the Association. The latter body have recently issued an instructive handbook on the differences between home manufactured and foreign cement, which also illustrates the schemes which are adopted to gull the unsuspecting. Some of the results of the tests are very striking, and in these days of concrete building the pamphlet should be studied by all those who have to carry out or superintend building and engineering works.

Tubular railways have, so far, but little particular interest for Irish engineers, beyond that general knowledge which is so essential to the professional man who wishes to keep himself abreast of the times. In England, of late years, various accidents have led to much thought being expended on fire prevention on these lines, for the tubes are so small, and the draught through them of such power that a slight fire in the train might rapidly develop into a huge conflagration, and the passengers, caught like rats in a trap, would stand but little chance of escape. A fire, which might have reached alarming proportions, recently took place in a train on the City and South London Railway, which has been singularly immune from accident. It comes as another hint that the carriages should be made of incombustible material, and that this should be compulsory. The Board of Trade have already framed a model set of by-laws, to which promoters of tubular railways will, in future, have to conform, but to be of complete utility as a safeguard, such regulations should be retrospective. It usually needs a horrible catastrophe to awake the British public to the necessities of a particular case, but so much attention is now being given to electricity that it is possible adequate safeguards will be taken in time to prevent calamity.

In these days, when a telephone is a necessity to every business man and a very desirable domestic adjunct, any improvement for the proper working of the instrument is worthy of note. The greatest disadvantage that exists is, perhaps, the difficulty of making oneself heard, and this is particularly the case over the trunk lines, when time is money indeed, and vain repetition tends to reduce one's capital. Or if one is heard, it is often at the sacrifice of all privacy, for in some “silent” cabinets with which we are acquainted, a closed door means semi-suffocation. The new invention, called the Secrephone, is one that, if it prove successful, will obviate this disadvantage. It consists of a peculiarly shaped aluminium mouthpiece, which screws into a hollow vulcanite bulb which is in two halves. The lower half is screwed into another vulcanite piece of various design to suit the transmitters now in use. By the attachment of this contrivance, messages can be sent so silently that a person standing but a yard distant cannot overhear what is said, and when the ordinary voice is used a much better result is attained at the receiver end of the system, than with the present form of transmitter. Experiments over a mile of Post Office circuit proved a whispered message, if clearly enunciated, can be correctly received at the other end of the line, and that over a trunk line, between London and Norwich, equally satisfactory results were attained. In addition to the secrecy ensured, the Secrephone is practically imperishable, and with ordinary use cannot get out of order; that with it, a bad or indistinct line is made clear under adverse circumstances, that the volume of sound over long distance telephones is increased threefold; and the troubles caused by induction and cross circuits are largely overcome. If these claims are substantiated, the invention should prove a boon to the public at large.

The recent depression in trade which, it is regrettable to state, has not yet passed away has had its natural effect on the railroads of this country. The reports of the large companies are practically identical, in that each shows a decrease in traffic and receipts, more particularly in regard to the carriage of cattle. The Dublin, Wicklow and Wexford Railway in this particular respect has a similar state of affairs to record, although its total receipts show an increase. Consequent on this diminution, and in the effort to keep up the dividends, expenditure on improvements has had to be deferred, and even the maintenance work as far as possible to be reduced. This results in lack of employment, and tends to a feeling of insecurity on the part of the



nervous passenger. The outlook in the engineering, as in the building trades, is just for the moment dull, but it is generally anticipated that a revival of business will shortly be felt. The necessity for "pinching" will then vanish. The Dublin, Wicklow and Wexford Railway differs from the other companies, in that its expenditure has increased, but its ability to meet all essential demands is owing to the large increase of traffic in general goods which has occurred yearly since 1897. The chairman of this line is naturally pessimistic as to the work that will be required within the near future to prevent the inroads of the sea, stating that "for some thirteen miles of our railway we are tenants from year to year, at the will of the wind and sea." For the last five or six years sums, varying from £3,000 to £5,000 per annum, have been spent on coast defences, but such are but temporary, and a severe sustained easterly gale would undoubtedly cause a repetition of the disastrous incursion of 1901 or worse. Having regard to this constant drain on the company's resources, which must naturally become heavier year by year, it is perfectly evident that a complete diversion of the affected portion of the line, south of Bray, will become necessary.

### REINFORCED CONCRETE PILES.

The subject of reinforced concrete has occupied so large a share of attention in the professional press that it is not surprising that much consideration has been given to the question of its employment in piles. The use of timber for that purpose is, of course, of very ancient date, but in many situations timber has considerable disadvantages, especially where subjected to alternate conditions of wetness and dryness; and where a timber pile is exposed it is liable to rot. Quite a number of systems of concrete piling have been devised, but in many instances these concrete piles seem to us particularly liable to fracture under the blow of the monkey.

Messrs. J. W. Stewart, of Belfast and Dublin, enclose us a booklet giving particulars of a new system of concrete piling for which they are the sole licensees in Great Britain, Ireland, and Isle of Man.

We have read the booklet carefully, and we think the system of concrete piling is one of the best yet brought under our notice.

The cost, we understand, works out much less than that of square timber piling, and its carrying capacity is, of course, vastly greater. It is practically a concrete pier built from the hard substratum up, as the piles can be driven to any depth and up to two feet in diameter. If required larger than two feet in diameter, special arrangements can be made to have them done.

A number of these concrete piles were driven by Messrs. Stewart in Birkenhead last month for the Tranmere Bay Development Co., and after they had been subjected to what were in the Company's Engineer's opinion sufficient tests the firm secured a contract from them for putting in the foundations of Messrs. Cammell, Laird and Co.'s new machine shop. The foundations consists of 1,100 concrete piles with concrete capping on top.

The main feature of the new system referred to, which is known as the "Simplex" system, consists in driving a hollow "form" to a firm bearing strata, introducing concrete through the form, and withdrawing the latter while ramming the concrete, so as to fill the space occupied by the form. Generally the form or casing occupies a smaller superficial area than the finished pile, due to the compression and spreading. The proprietors claim for this system that it is at once simple, efficient, and economical. This pile may be driven in the worst class of ground, or in ground absolutely impenetrable to a wooden pile. It can be got down in spite of ordinary boulders and similar obstacles.

The main feature of the patent consists in driving a hollow "form" to a firm bearing strata, introducing concrete into the form, and withdrawing the form while ramming the concrete; hence, as already mentioned, the pile itself becomes larger in sectional area than the form.

The type of form usually employed is the "alligator joint," which is simply a tubing finished with a pair of toothed jaws, which are closed and go down pointed while the pile is being driven, but open when being withdrawn, and the concrete is being filled in and rammed.

The driving is performed with an ordinary pile driver. When driven to the necessary depth the form is filled for a depth of 3 feet with concrete by means of a special bucket. The form is then pulled up 2 feet, the jaws open letting the concrete through; the concrete is then rammed. Three more feet in depth of concrete is then put in, and the form pulled up another 2 feet, and so on. The entire hole is thus perfectly filled to bulging with solid rammed concrete.

Where necessary, the pile can, of course, be reinforced

with steel rods. A group of such piles capped with concrete yields an immense resistance for the foundations required to bear exceptionally heavy weights. These forms can be driven by hydraulic with a water jet, in the same manner as wooden piles, where sand prevails.

Amongst the chief advantages as enumerated by the patentees may be mentioned:—

1. At the foot of such pile, which bears directly upon the firmest ground it has penetrated, the immediate bearing surface of the Simplex Pile is about four times that of an ordinary wooden pile, owing to the fact that the Simplex pile is of a greater diameter and retains its diameter undiminished for its entire length; while the wooden pile is materially reduced in diameter by its tapered lower end at the most important point.

2. The Simplex Pile, having a cubical capacity of about two-and-a-half times that of a wooden pile, compresses the earth that many times more throughout, and four times as much at the bottom where the ground is usually the firmest by nature, thereby creating a greatly increased unit resistance in the earth which receives the thrust of the pile; while the actual thrust per unit of wear is much less, owing to the enlarged lower end of the pile itself.

3. The Simplex Pile with a diameter of 16 inches throughout its entire length, as compared to a wooden pile, 12 inches in diameter at the butt and 8 inches at the point, presents a much greater superficial friction surface than the wooden pile.

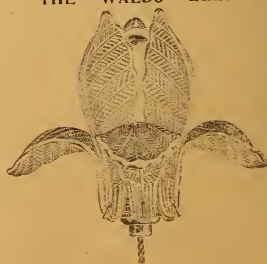
4. This greatly increased superficial friction or bearing surface is still further augmented by the roughness of its sides, resulting from the larger pieces of "aggregate" which have been forced laterally into the surrounding compressed jacket of earth, by vigorous ramming. For the same reason, the coefficient of friction is also much greater than with any other form of pile.

The piles thus "hold" with great tenacity; moreover the greatest resistance is obtained low down where the ground is firmest, and it is mentioned that one square foot of side friction at the bottom of a 30 foot pile is quite equal, in some cases, to 10 square feet near the top. These piles are never tapered, but are driven in a straight shape, hence they hold better. When a pile is too easily driven it argues inutility and loss of resisting power, due to loss of friction. The full bearing power of every pile is thus realised. Thus is further claimed that foundations on any sort of smooth pile, whether of wood, iron, or concrete, almost always fail by "increased penetration"—a sure sign that the bearing power of the soil itself has not been developed, because the skin friction is not equal to it. It almost never happens that the crushing resistance of the pile itself is developed, whether it be of wood, of iron, or of concrete. Nearly all piles are stronger than the earth which supports them, yet the Simplex Pile is the only one that can develop the full strength of this same earth—the weakest link in the chain!

This system has been extensively used in America, particularly in Government buildings, including many cases where it was found absolutely more economical to pile on the "Simplex" system, rather than go down even a comparatively moderate depth to secure a safe bottom, in the ordinary fashion.

We understand Messrs. Stewart will be happy to afford any reader interested fuller particulars and advice as to the utilisation of this patent.

### THE "WALDO" ELECTRIC LAMP SHADE.



We illustrate a new electric shade which has recently been placed on the market by Mr. A. Woodall, glass manufacturer, of 37 Brooke-street, Holborn Circus, London, E.C. This shade is British made, and gives a beautiful soft light without any diminution of brilliancy. Each leaf can be detached for cleaning or replacing.

The increased interest in the uses of concrete for engineering and building work is evidenced by the announcement that a new journal, under the title of "Concrete and Constructional Engineering," will shortly be issued. It will be published bi-monthly at 1s.

## THE DUBLIN MAIN DRAINAGE SCHEME.

Last week Mr. P. C. Cowan, C.E., Chief Engineering Inspector, Local Government Board, resumed the inquiry which had been adjourned from last December in reference to applications made to the Local Government Board for loans for various city improvements. The loans were for:—

- £100,000 for extending electric lighting works;
- £42,000 for completion of main drainage system;
- £4,900 supplemental for utilisation of tramways in connection with the cleansing system;
- £4,450 for Townsend-street artisans' dwellings; and
- £1,873 11s. 5d. on concreting works in Drumcondra.

Messrs. Ignatius O'Brien, K.C.; and P. O'C. White (instructed by the Law Agent) appeared for the Corporation.

Mr. R. Dickie (instructed by Messrs. Reddington and Sainsbury) appeared for Mr. T. P. Bradshaw in reference to the Clontarf drainage.

Mr. O'Brien said the inquiry had been adjourned at the request of the Inspector that evidence as to the efficiency of the main drainage system as designed, and also its cost, might be procured, and the Corporation at considerable expense had proved this evidence.

Sir Alexander Binnie, President of the Institute of Civil Engineers, who had been Chief Engineer of the London County Council, described the London main drainage system which had been designed by Sir Joseph Bazalgette in 1855 to 1860. Sir Joseph Bazalgette assumed the maximum flow of sewage would take place in six hours; he also assumed that the maximum flow would be coincident with the rainfall. In 1851 the population of London was 2,362,000; in 1861, 2,600,000. He made a provision for a total population of 3,500,000. At present the population contributory to the main drainage was about 5,200,000, and the average flow of sewage was about 48 gallons per head per day. The water supply in 1851 was from 20 to 25 gallons per head per day, it now amounted to nearly 35 gallons per head per day. In 1866 or 1867 Sir Joseph Bazalgette designed the present purification works at Barking for North London, and at Crossness for South London. The capacity of the works was to deal with 150 to 160 million gallons of crude sewage a day, and it was expected that the output of sludge would amount to 3,000 tons of sludge per day for the whole of London. As the work proceeded it was discovered that the estimate of empeded matter in the crude sewage was too low. The works as designed at Barking consisted of 13 precipitation channels with a total capacity of 3,250,548 cubic feet. These involved a capital expenditure of £362,568, and the working expenses, including interest and sinking fund, £72,256 per annum, or at the rate of £1 8s. 6d. per million gallons dealt with. He thought it would be better to discharge the chemicals into the crude sewage immediately before it entered the precipitation channel.

One of the first discoveries made when the works were started was that the intermittent treatment did not produce the result expected, and the precipitation channels were converted from intermittent to continuous treatment. At Crossness there were four precipitation channels, with a capacity of 34,555 cubic feet. The sludge produced at Barking and Crossness was conveyed to sea in six ships. The sludge until recently was deposited in the Barrow Deep, a distance of about 50 miles from Crossness and 20 miles beyond the Nie. The place of deposit had recently been altered to the Black Deep, immediately adjoining the Barrow Deep. After 14 years' work he had been assured by one of the officers of Trinity House that he had recently surveyed the Barrow Deep, and could find no trace of any deposit in that channel. The effect of the precipitation works on the Thames had been most marvellous, the banks had been freed from the black and offensive mud which formerly accumulated upon them, and the river itself freed from the large patches of black putrifying matter which formerly floated upon its surface, and fish life was gradually returning to the river. He was glad to see that in respect to enlarging the precipitation channels, as well as in mixing the chemicals with the crude sewage immediately before precipitation, he was glad to see that the Dublin works had been designed on the experience gained in London. He had gone over with Mr. Chatterton his proposed liming plant, and could only say that he had adopted from their experience in London all those improvements which he himself would like to have carried out. Finally, he expected that the operation of the Dublin works would be a great improvement on those in London.

To the Inspector—The suspended sludge in Dublin sewage should be ascertained if possible; but he thought the correct measurement could only be formed when they had actually precipitated it. If he were asked off-hand to decide the amount of solid matter in Dublin sewage he would say about

forty grains. He should not advise a Corporate body to expend very much upon improving gullies.

As far as I understand there is no way of clearing out the pit below the gullies in Dublin unless you break up the sets? That is rather old-fashioned, no doubt.

Do you know of any place where the use of lime in small doses has been found sufficient to effect the purpose? Oh, yes, many places—in Bradford it is entirely a lime treatment.

Why is iron used in Glasgow and London and not proposed to be used in Dublin? To tell you the truth, I never saw what it was used for in London. He considered Mr. Chatterton's estimate of 50 gallons per head quite sufficient. The works at Barking and Crossness had exceeded all expectation, and the County Council had no idea of adopting any other scheme; they were making various experiments in filtration, and intended to increase the present works. If he were designing works himself, and not as he was in London, carrying out another engineer's design, he would go on the lines of Mr. Chatterton.

## ANSWERS TO CORRESPONDENTS.

## "Insurance or Assurance."

"ENQUIRE" asks us to explain the difference between these two terms; quite accidentally we came across a little pamphlet issued by the General Accident Company (who, by the way, undertake contractor's surety and employer's liability risks). The matter is therein elucidated as follows:—

(1) The term *Insurance* is used as a general term to cover all kinds emanating from the original loss-sharing principle—fire, life, marine, etc.

(2) The term *Assurance* has not been universally accepted as applying to life assurance alone, although it would appear that if two terms are admitted, a distinction should, logically speaking, be drawn between their meanings.

(3) The history of the subject shows that in its earliest form life assurance was known not as a promise to pay on the death of the individual, whenever it might occur, but as a promise to pay only in the event of death occurring within a fixed period. Moreover, other forms of life assurance have come into vogue (e.g., an assurance payable only in the event of A dying in the lifetime of B) which constitute not an absolute promise to pay a sum at an uncertain date, but a promise to pay in the event only of a certain contingency coming to pass.

## Sewage Tanks.

"SIMPLEX" consults us with reference to reducing the capacity of some sewage tanks which he had designed on the basis of 0.14 day's dry weather flow of the summer population of a seaside resort.

[Our view is that you ought not to be particularly anxious to reduce the capacity of the tanks unless you are convinced it makes for much greater efficiency in the effluent. You could, of course, throw one tank permanently out of action, except as a lie-by. Our reason for recommending this is that the ground being very bad, it would be an economy to provide now against any possible future extension. That is to say, it would be cheaper to put in a larger size of tank, or an additional tank, now rather than to put in smaller tanks, or fewer tanks, afterwards, and to have to add thereto should increase in the population occur, because the single item of a steam pump alone makes a considerable difference; and you have now a moderate schedule price, whereas hereafter the nature of the ground would have to be described, with a consequent increase in the cost of an extension. Our advice is to retain the original capacity of tanks, the contents being based on a capacity of  $\frac{1}{2}$  day's dry weather flow of the summer population, but divided into four tanks instead of two. We should prefer a longer and shallower tank—say, 4ft. 6in. depth of water. Using four tanks instead of two will achieve the same end as reducing the size of the tanks.]

## Carpenters and Trade Union Congress.

Last December, Hull, the sixth branch of the Amalgamated Society of Carpenters and Joiners, suggested to the Executive Council that the organisation should not be represented at the future Trade Union Congresses. In January, five branches—Partick, Wavertree (Liverpool), Rotherham, Fulham 1st (London), and Hull 1st endorsed the proposal. The Partick communication says that "the overthrow of the present capitalistic system of production for profit can only be brought about by the presence inside the House of Commons of an Independent Labour party, and not by cap-in-hand deputations." Wavertree expresses the opinion that Congress has "outlived its usefulness," Fulham, that it is "an obsolete institution and entirely unsuited to the needs of the present time," and Hull that membership is "a useless expense to the Society."



# THE ENGINEERING AND SCIENTIFIC ASSOCIATION OF IRELAND. Annual Dinner.

The above Society, which has, within so few years, done so much to bring the younger members of the Engineering profession into touch with one another, is also in many ways filling a gap in the social life of Dublin. This is evidenced especially in its annual dinner, and the one held this year, as in former years, was noticeable for the number of the guests who are widely known as representative of their respective professions. The President of the Association, Sir Charles Cameron, C.B., occupied the chair, and amongst those present were the Bishop of Meath, Sir A. Weldon, Bart., D.Sc.; Sir J. B. Dougherty, C.B., C.V.O.; Admiral Tudor, C.V.O.; Sir Howard Grubb, F.R.S.; the President of the Royal College of Physicians (Sir W. J. Smyly), Sir L. H. Ormsby, L. E. Dowdall, C.B.; T. P. Gill, Secretary of the Department of Agriculture; Sir John Ross of Bladensburg, K.C.B.; Major General W. F. Vetch, C.V.O.; Sir Otto Jaffé, D.L.; the Provost of Trinity College, Professor Barrett, F.R.S.; the President of the Royal Institute of Architects, Ireland (Mr. W. M. Mitchell, F.R.I.B.A.), the President of the Architectural Association of Ireland (Mr. Harry Allberry, A.R.I.B.A.), and the President of the Institute of Civil Engineers, Ireland (Mr. William Ross).

There were in all about 150 guests. After the toast of "The King," which was honoured with enthusiasm, Mr. P. S. Sherdown, Vice-President, gave the toast of "The Navy, the Army, and the Auxiliary Forces," which was responded to by Admiral Tudor, C.V.O., Major-General Vetch, C.V.O., and Colonel Jackson, R.E. The latter said he had seen a great many armies at home and abroad, and his experience was that the British officer was capable of doing work when he got it. He may hate reading and examination, but give him anything practical and there was no better officer on the face of the globe.

The President, in a most humorous speech, proposed the toast of "The Guests." The Bishop of Meath, in reply, said it was sometimes stated that there was antagonism between religion and science, and arguments to this effect were frequent and noisy, but it would be obvious to those assembled that true religion and true science were correlative, and could never be antagonistic.

Professor Barrett, F.R.S., said that the Association, although one of the youngest in Dublin, was one of the most flourishing and prominent, and, doubtless, much of this was due to the able guidance of the President. The Society was fortunate in receiving a *locale* for its meetings at the College of Science, and, as far as he was concerned, his services were always at its disposal.

Sir James B. Dougherty, C.B., C.V.O., and Sir Otto Jaffé, D.L., also replied.

Mr. J. Halliday, Vice-President, proposed the "Scientific Institutions and Associations." He said that their Association during its few years' existence had received from other bodies in Dublin the greatest help and encouragement, which had tended to smooth its difficulties. It would perhaps be invidious to single out any special institution for thanks, but he could not help expressing their members' obligation for all that the Institution of Civil Engineers in Ireland for all they had done for them. And in this connection he was reminded of yet another Irish grievance. The Institution of the Civil Engineers of England was the leading body of the engineering profession in the Kingdom, yet in looking over the list of the members of the Council and the more distinguished persons of that society, he did not find a fair proportion of practitioners in Ireland. They in Ireland wanted a fuller representation in the English Institution and on the council of a kindred institution—viz., the Mechanical Engineers. He hoped one day to see the President of the Irish Institution President of the English Institution.

Mr. William Ross, President of the Institute of Civil Engineers in Ireland, in reply stated that he welcomed the growth of the junior society, and trusted that it would flourish, and he considered that the combination of engineers and scientists was an exceedingly happy one. By it they had brought down to daily life the real qualities of science, which had thereby been encouraged and popularised. They were also free from the small details which must always occupy a predominant professional society, and unhindered by the difficulties that a professional society must always meet when guarding the privileges and interests of its members. He rather deprecated the remarks of the proposer as to the English Institution, as he did not consider the Engineering and Scientific Association represented in any way the engineering profession in Ireland. This country was a sufficient field for Irish engineers, and the Irish Institution was better employed in representing their own practitioners. The English engineers had no idea of excluding or of swallowing up the sister institution, on the contrary the two institutions were working hand in hand, each properly fulfilling its duties as representing engineers on its own side of the channel.

The President of the Royal College of Physicians and the Vice-President of the Royal College of Surgeons also replied.

The Provost of Trinity College, fresh from his tour with the British Association in South Africa, proposed the toast of "The President and the Association." From his remarks it appeared that he did not think the much-talked-of bridge over the Victoria Falls was a very wonderful engineering feat—indeed, it seemed to him to be quite ordinary.

The President replied in that felicitous manner which is associated with him, and the company separated after spending a thoroughly enjoyable evening. During the evening songs and musical items were contributed by members and guests, but, owing to the number and length of the speeches, this portion of the programme was somewhat curtailed.

## FAIRVIEW SLOBLANDS.

Mr. P. C. Cowan, Chief Engineering Inspector, Local Government Board, held an inquiry with reference to an application by the Dublin Corporation for a provisional order to amend the Clontarf Urban District Council Act of 1900, and also for a provisional order to empower the Corporation to acquire compulsorily, certain slob lands at Fairview for the purpose of being used as a place for disposing of street refuse, and for laying out and maintaining a recreation ground. They asked the Local Government Board to sanction for these purposes a loan of £15,500.

It is proposed to acquire the whole of the sloblands lying between the high road and the railway, 57 acres in extent, and which is at present covered by the tide at high water, and to close the two railway arches, through which the tide flows in and out.

Mr. White said that the first rights to be guarded were those of the Crown. The Corporation had been informed that, *prima facie*, the land in question belonged to the Crown, and could not be compulsorily acquired, but he understood that this would be a matter of arrangement, and he did not anticipate much difficulty in connection with it. The Port and Docks Board also had rights, which would be protected by terms hereafter to be arranged. The matter had been practically settled. The Corporation offered £8,000, which the Port and Docks Board could expend in dredging. The other body interested was the Great Northern Railway Company, and with them also the Corporation were practically in agreement. That company had insisted that a wall should be built to separate the two properties. There were also two private owners to be arranged with.

Mr. Joseph P. Kerrigan, City Accountant, stated that the margin for borrowing by the Corporation was £605,435. The total indebtedness of the Council in respect of loans was £2,461,077 gs. 7d.

## ENGINEERING NEWS.

**Belfast.**—The Board of Guardians received proposals for fitting up and completing five baths at girls' school department of the workhouse.

**Buncrana.**—THE MAIN DRAINAGE.—The Inishowen Rural District Council invite tenders for constructing the outfall sewer. Amended drawings and specifications may be seen at the office of the engineer, Mr. T. Johnston, East Wall, Derry, or with Mr. Wm. Doherty, J.P., Buncrana. Tenders close on March 1st.

**Dundalk.**—The Dundalk Harbour Commissioners will, on the 5th March, receive tenders for repairs to the boilers in steam dredger, "Faugh-a-Ballagh," as she now lies at her berth at Tug Wharf, on Embankment, Dundalk.

**Gort.**—The Rural District Council received applications for the position of engineer and architect to the Council and Board of Guardians.

**Limerick.**—The Town Clerk has received a communication from the Castle announcing that the Lord Lieutenant has acceded to the request of the Borough Council creating the office of Assistant City Surveyor with a view to appointing thereto Mr. Maurice Fitzgerald, who has been for a number of years in the Department, both with the former and present City Surveyor. The new office simply secures fixity of tenure for Mr. Fitzgerald, who continues at the same salary as heretofore.

The Limerick Harbour Commissioners, on 26th instant, will consider tenders for a supply of paving setts from approved Irish quarries.

Messrs. Helliwell and Co., Ltd., of Brighouse, Yorkshire, and 11 Victoria-street, Westminster, London, having completed the glazing with their patent "Perfection" system without putty on the New Cross and Camberwell car sheds (131,000 super feet) for the London County Council, have now received the contract for the glazing to the new car sheds in Jews-row, Wandsworth, and the sub-stations at Streatham, Battersea, and Wandsworth.





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## THE RAILWAY GAUGES OF INDIA.

At the last ordinary meeting—Sir Alexander Binnie, President, in the chair—the paper read was “The Railway-Gauges of India,” by Mr. F. R. Upcott, C.S.I., M.Inst. Ce.E. The following is an abstract of the communication:

The author submitted this paper for consideration with the object of obtaining opinions from those qualified, both from their past experience and their present interests, to advance views on the various suggestions made. The principal points discussed in the paper related to the 5-foot 6-inch and metre-gauge lines only:

- (1) The possibilities of making a uniform gauge in India.
- (2) Whether the cost and the confusion necessarily entailed in arriving at a uniform gauge would outweigh the advantages.
- (3) Whether the growing needs of traffic can be met by retaining different gauges, and treating each case on its merits as it arises.

The paper pointed out that India is self-contained, and therefore no question need be entertained of linking up adjoining countries by a uniform gauge; also, that the original policy of confining special gauges to definite areas has not been rigidly enforced; although this departure has actually resulted in a benefit, as it has given 5,000 miles more of open line than might otherwise have existed at the present time.

The existing mileage of the four gauges, open or under construction, was at the date of the latest available information:

	Open for traffic, miles	Under construction, miles
Standard gauge (5 feet 6 inches) ...	14,477	1,162
Metre “ 43 feet 3 3/4 inches) ...	11,421	1,273
Light “ (2 feet 6 inches) ...	796	575
“ (2 feet) ...	262	113

The author raised the question whether the metre-gauge system should be allowed to enter the great seaports of Calcutta, Bombay, and Karachi, and points out the necessity for the northern and southern metre-gauge systems being freely connected.

The advantages of a uniform gauge were then demonstrated, as

- (1) Eliminating trouble and cost of transhipment.
- (2) Giving a wide field for interchange of rolling stock.
- (3) Simplifying concentration of troops, material and supplies in military operations.

Uniformity of gauge may be obtained by

- (1) Changing metre gauge to standard gauge.
- (2) Changing standard gauge to metre gauge.
- (3) Adopting a 4-foot 8 1/2-inch gauge.

The first method would give greater capacity and speed at considerable cost; the second method would give a lower capacity at a smaller outlay; while the third method would be more costly directly in money, and indirectly by causing great confusion and intolerable delay to traffic. The question, therefore, seems to be whether a single standard (5 feet 6 inches) track should not be substituted for single metre-gauge (3 feet 3 3/4 inches) when the capacity of the latter has been outgrown, or whether in such a case the metre-gauge track should preferably be doubled.

The author next showed that the cost of working, and the return on capital expenditure are practically equal on the two gauges. He gave tables contrasting the carrying capacities of the two gauges, and figures showing the cost of conversion of metre gauge to standard gauge, derived from actual work done on an aggregate length of 250 miles on various systems. He then discussed the difficulties of the situation, particularly as regards the seaports and coal-fields, and suggested that so far, India has not suffered from having a variety of gauges.

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## CONTRACTS.

## TO BUILDERS.

Tenders required for erection of a new Banking Premises in Navan, Co. Meath, for the Belfast Banking Co., Ltd.

Drawings and Specification may be inspected at the Architects' Offices, where Bill of Quantities may be obtained upon deposit of Three Guineas, which will be returned to the tenderer upon the receipt of a bona-fide Tender (provided the Tender be not withdrawn) and the Quantities supplied to him returned.

Sealed Tenders endorsed “Tender for Belfast Bank, Navan,” must be delivered to the undersigned at their offices not later than 2nd March, 1906.

Quantities prepared by Mr. James Mackey, Surveyor, 58 Dame street, Dublin.

Solvent security for the due performance of the work will be required.

The lowest or any tender will not necessarily be accepted.

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## TO CONTRACTORS.

Estimates required for Heating the two New Blocks now in course of erection. The lowest or any tender not necessarily accepted. Tenders addressed to the Resident Medical Officer, to be lodged with him on or before the 26th day of March. Plans and specification to be seen at Asylum and at the office of the undersigned,

J. F. FULLER,

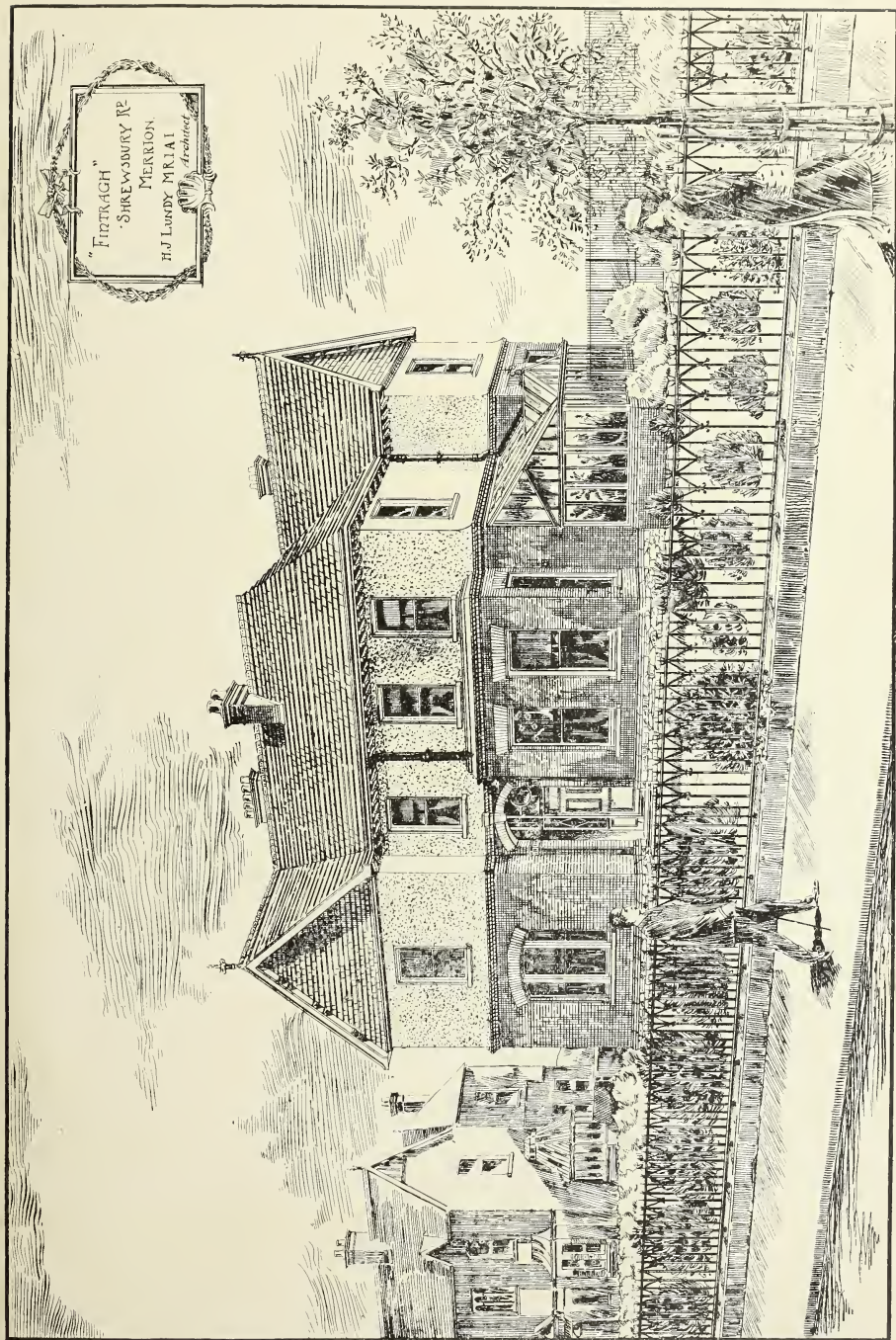
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*H. J. Lundy, M.R.I.A.I., Architect.*



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# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,

ARTS AND HANDICRAFTS.

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HEAD OFFICE

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## TOPICAL TOUCHES.

On Tuesday last, Mr. W. J. Stewart read a very interesting and instructive paper on "Temporary Buildings" before the Architectural Association of Ireland.

Our contemporary, the "British Architect," gives prominent place in its last issue to the able article on "The Profession of Architecture in Ireland," by Mr. Robert Elliott, which originally appeared in our columns.

The fourth annual report of the Competition Reform Society, which was established to secure fairness in architectural competitions, is before us, and shows that the Society has been active during the past year, dealing with thirty-five doubtful cases, in several of which modification of objectionable conditions was secured. The report notes the great falling off in the number of competitions during the past year.

The Society of Architects, London, notify competitions for a travelling studentship, value £25, which also carries with it the silver medal of the Society, and also for a scholarship value £10 and tenable for three years, for which there will be a competitive examination in the form of an essay on Architectural History, and a freehand drawing, held in London on May 10th, 1906, entries for which must be made before May 1st on a form to be obtained of the secretary. No entrance fee is required.

This scholarship is the first of the kind ever offered in connection with architectural education. Those who propose to compete and are not at present on the Register of Students of the Society, should communicate with the secretary, Staple Inn Buildings, Holborn, London, W.C., at once, when the necessary papers will be sent to enable them to register. In the meantime, there is no reason, the Council intimate, why such intending candidates should not (pending their admission to the Register) proceed with the preparations of the drawings, which must be in by May 1st.

We are glad to see that at long last the Government has recognised the importance of proper inquiry into the question of canals and inland navigation, and a Royal Commission of a very representative character has been appointed. Amongst the Commissioners is Mr. J. P. Griffiths, the Engineer to the Dublin Port and Docks Board. The increase of railways in Ireland has not been an unmixed blessing. Monopolies of transit have been established, and freights have become destructive of Irish manufacturing enterprise. The Irish Parliament voted substantial sums of money for the construction of canals, but by slow degrees the canals have fallen more and more into disuse. In fact, until the late Mr. James McCann undertook, with signal success, the re-organisation of the Grand Canal Company, those fine inland waterways, the Grand and the Royal Canals, were almost unavailing of by traders. What Mr. McCann accomplished in the case of the Grand can be extended and done in the case of the other canals of Ireland. It is impossible not to recognise that the possibilities of their extension and improvement afford one of the best possible methods of encouraging Irish manufacturing industries. We anticipate that the Commission will result in some practical changes of far-reaching importance.

At the general meeting of the Royal Institute of British Architects, held in London on 5th inst., no less than 44 candidates were admitted to membership as associates. Of these apparently but one was an Irish candidate, viz., Mr. Dominic M. O'Connor, M.A., B.E., of 4 Pembroke-square, Kensington, W., and Ashton Lodge, Cork. As nearly all these candidates are presumably new recruits, it becomes rather a forcible illustration of the over-stocked state of the architectural profession, and brings rather forcibly and unpleasantly before us the conundrum as to how many additional members the calling may reasonably hope to support.

The Court of King's Bench, consisting of the Lord Chief Justice, Mr. Justices Gibson, Boyd, and Wright, by a majority of three to one, granted the plaintiffs' application in a motion for a new trial of the action of Pearson v. the Dublin Corporation, the Lord Chief Justice dissenting. Our readers will recollect that this important case, involving £36,000, was originally tried by the Lord Chief Baron and a special jury, ended in a direction for the defendants by the learned judge. The grounds of appeal were that there had been a misdirection by the judge. In accordance with the decision of the full Court, a new trial will take place, and it is probably not too much to say, that whatever the results, proceedings are not likely to end until the decision of the ultimate Court of Appeal has been taken. The claim involves issues of almost vital importance to contractors and employers alike, involving questions hinging on implied warranty of plans, liability for accidental error, and what constitutes legal fraud.

In their annual report, read at the last general meeting, the Royal Society of the Antiquities of Ireland record the death of Mr. M. J. C. Buckley, a frequent contributor to our columns, thus:—

Mr. Michael J. C. Buckley, who was elected a *Member* in 1888, acted as Hon. Local Secretary for East Cork, and rendered valuable assistance in connection with the Meeting and Excursion at Youghal in July, 1903. He contributed several Papers to our *Journal*, comprising "The Ancient Stained Glass of St. Canice's Cathedral, Kilkenny," "The 'Bambino' of New Ross," "Notes Ecclesiastical," and in connection with the Youghal Meeting he furnished several interesting Papers on the antiquities of that neighbourhood. Mr. Buckley was a fluent speaker and writer on all subjects relating to church architecture. He was, for the greater part of his life, connected with an eminent firm engaged in the production of artistic ecclesiastical work. He possessed a fine collection of antiquities, including some specimens of early Celtic art. His comparatively early death is greatly deplored.

We had the pleasure of knowing Mr. Buckley for many years, and he was a delightful and interesting talker on all that pertained to ecclesiastical architecture, though brought up in a severely antiquarian school, no man appreciated more warmly than he the breaking away from hide-bound tradition, exemplified in the work of the best men, such as Bodley, Leonard, Stokes, and others, in their later work. Mr. Buckley had an especially profound knowledge of mediæval embroidery and wood carving. Mainly through his instrumentality the beautiful sixteenth century Waterford vestments were secured for the Museum of Science and Art in Dublin. He wrote a very able brochure on these vestments.





## ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

### Attendance.

Why is it that the attendance at both general meetings and classes shows a tendency to go off as the session goes on? Possibly it may be the Committee's fault for not providing more delicate dainties for the particular palates of our architectural appetites. The good, wholesome porridge of "conditions of contract" and the dry bread of archaeology alike seem to fail in exciting that hunger which ought to make the summons to a meeting as sweet as the sound of the dinner bell.

### Our Disgrace.

After all, it is no wonder that English architects are brought over here, to our disgrace, to design anything much larger than a villa residence; or, on the other hand, that speculative builders never dream of seeking help from any one who charges a fair price for his work. The fact of the matter is, we are in a low state of health, architecturally speaking. Our interest in our food is not so keen as it ought to be, and we present as a natural result but a poor, pallid complexion to the world. There are bright exceptions; there are men in Dublin who do their best, and others who do their worst, with a whole-hearted energy and perseverance,—men who work hard and honestly; but after all it is not the few who can change public opinion with regard to the profession. Many talents are given to architects, and of them much is required; and the man who takes the like easily and expects knowledge to come to him without much effort on his part is not only wasting his own time but is causing injury to his profession and retarding the progress of his country.

### Education.

We learn with regret that the response to the circular sent out by the Education Committee has been most disappointing. It is a curious and suggestive fact that the best supporters of the A.A.I. are men who have either had a few years' practice themselves or have had an opportunity of learning their own ignorance in some other way. It is enough to make one despair of the architectural future in Dublin when we try (and fail) to make some of the younger members see that steady, hard work for several years is necessary before even a genius has a right to call himself an architect. The result of our experience is the conviction, that as long as admission to the Institute and the profession can be obtained without examination, just so long will the rising generation of pupils sail through the most valuable time in their lives in the present easy-going fashion.

### "Simplex" Concrete Piles.

In our recent notice of this patent system of concrete piling, for which Messrs. J. W. Stewart, of Dublin and Belfast, are the Irish licensees, we omitted to mention that they cost less than ordinary piles, and that, of course, in addition to the carrying power is at least as much more, not to speak of the durability.

## OUR SOUTHERN LETTER.

(FROM OUR OWN CORRESPONDENT).

### Railways.

The promoters of the three Bills in Parliament this session for the proposed Cork Junction Railways have appeared before the Cork County Council in reference to the proposed guarantee from that body. The Council having heard the views of the promoters of the schemes, decided that they would refuse the guarantees. The promoters of the Cork and Waterford Railways practically decided that without the guarantee they were afraid they could not proceed. The inducement they held out to the Council was, that the Youghal to Cappagh line would become, if carried out, an alternative route from Cork to Dublin. The promoters of the other two schemes decided that they would proceed without the guarantees.

The Great Southern and Western Railway Company have passed a resolution in favour of the Cork City Railways and Works' Scheme, and further agreed, that if the Great Western Railway Company of England put any money into it they would give them the option, when they so desired, of taking their interest over at cost price.

At a special meeting of the Great Western Railway Company a resolution was unanimously passed approving of the Cork City Railways and Works Bill, for the purpose of authorising that company to subscribe to the scheme.

The approval and support of these two companies, with the approval of the Cork, Bandon, and South Coast Railway Company, ought to go a long way towards assuring the passing of this scheme, which would settle this much-discussed question.

The above resolutions could only come into force when the Bill became law; if it so happened that the Cork Link Railways Bill found favour with the House of Commons, it is probable that these railway companies might still be induced to give their support to such a measure.

### Water Works, etc.

The War Office, having practically approved of the proposed water supply for Crosshaven, Camden, etc., the District Council have decided to call a special meeting to consider the matter, and also to consider the following terms proposed by the military authorities:—

"That the Council should guarantee a minimum daily supply of drinking water to Templebreedy Fort (230 feet above O.D.) of 5,000 gallons, and to Camden Fort (210 feet above O.D.) of 15,000 gallons. The military authorities paying £300 for the first 10 years and £250 for the next 20 years—that is, a total sum in 30 years of £8,000.

"The supply to be continued at a rate to be agreed upon, the said rate not to exceed the due proportion of the costs of maintenance only which may then be payable."

These terms, which seem fair and reasonable, should insure the immediate carrying out of this scheme.

Messrs. Kaye-Parry and Ross, civil engineers, having submitted to the Rural District Council of Mitchelstown an amended plan of the proposed sewage disposal works, dealing with a closed instead of an open tank. They estimate the cost of the proposed works as follows:—

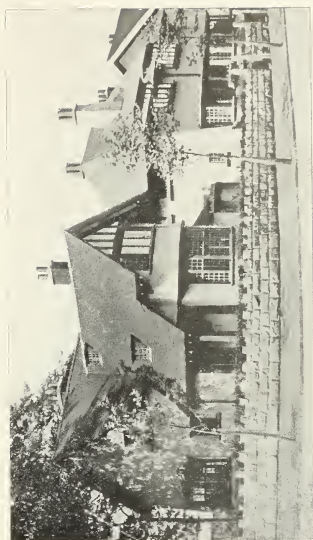
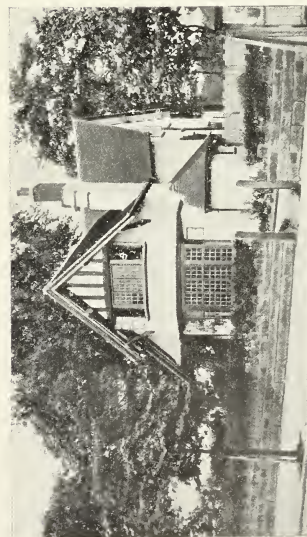
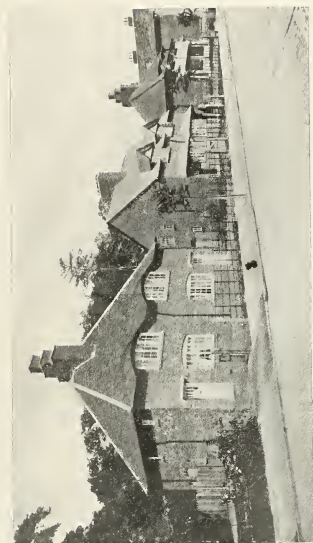
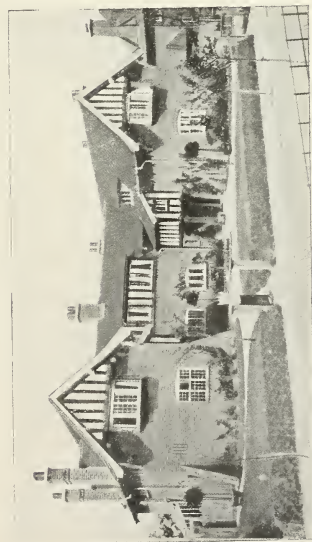
Closed tank, £160; grill chamber and intake, £30; outfall pipe to point about 200 feet below the bridge, £280, with the cost of filter beds, say, £800, making a total for the closed tank system of £1,250. It was agreed by the Council to carry out the works connected with the closed tank.

At the Local Government Board Enquiry held in reference to the application of the County Cork Joint Hospital Board for a loan of £14,500 for the purpose of providing a sanatorium for consumptives, Mr. Richard Evans, C.E., Architect to the Board, stated that the proposed cost of fitting up the buildings under the chalet system and the buying of the land would amount to about £11,590. The land was valued at £2,672 and contained about 130 acres. The sanatorium was to provide for 60 beds, cost per bed being about £200.

There appears to be only one sanatorium in England and one in Ireland on the chalet system, the others being on the block system. Evidence was given as to the cost of sanatoria in the following places as:—

Denmark, 120 beds at £167 a bed; Switzerland at £137 a bed; in these two cases the land was given free; Bath, £536 a bed; Bradford, £230 a bed, and the highest given was Manchester, £1,000 per bed.

We have just tried a couple of samples of Ford's blotting paper, which have been sent us. We have never used a blotting paper we liked better. It seems both lasting and absorbent to the end. Ford's blotting paper is sold by the leading Dublin stationers.



Some Cottages on the Bournville Estate.

Mr. W. Alexander Harvey, Architect.



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**AGREEMENT WITH A BUILDER OR CONTRACTOR**

As promised in our last issue we publish two forms of agreement, constituting "general conditions" and "articles of agreement" combined. Both are taken from a standard work on conveyancing law, and appear to cover every point save the architect's control. This, however, may easily be dealt with by adding a claim to the effect, that all the works are to be "done to the architect's satisfaction," and that "in the event of dispute, his decision shall be final and binding." Twenty clauses could not say more than this.

**Agreement to Execute Works.**

1. The contractor shall forthwith commence and before the expiration of — weeks from this date in all respects complete with best materials in the best workmanlike manner, and to the satisfaction of the owner all the works and things mentioned or referred to in the particulars or specification hereunto annexed, in and upon the house and premises therein mentioned.

**To Remove Plant on Completion.**

2. The contractor shall within one week from the completion of the said works and things, remove all his scaffolding, plant, and materials from the premises.

**Payment.**

3. The owner shall pay to the contractor the sum of £—— for the said works and things.

**Penalties for Delay.**

4. If from any cause whatever the said works and things shall not be completely finished, and the said scaffolding, plant, and materials removed within the time and in manner aforesaid, then the owner may deduct from any money then or thereafter due or payable to the contractor the sum of £—— per day for every day after the expiration of — from this date until such completion and removal shall be effected, as and for liquidated damages.

**Payment of Penalties.**

5. In case there shall not be sufficient money due to the contractor to make such deduction, then the excess shall be paid by the contractor to the owner.

**Default of Contractor.**

6. In the event of such default the owner may employ and pay other workmen to finish the said works, and may use any scaffolding, plant, materials on the premises belonging to the contractor for such purpose, and should he pay, or be liable to pay, a larger sum for finishing such works than the amount he would be indebted for to the contractor, then the excess shall be paid to him by the contractor.

**Owner may require omission of works.**

7. The owner may, if he thinks fit, require the omission of any of the works, and in that case a proportionate sum shall be deducted.

**Contract to include incidental work.**

8. All work rendered necessary in consequence of the doing of the works hereby agreed upon shall be deemed to be included in and form part of this contract, although not mentioned in the specification, and no additional payment shall be made to the contractor for the same.

**Additional works only upon written order.**

9. No extra or additional works shall be done by the contractor except upon the previous order in writing of the owner agreeing to pay for same, and should the same be done without such order the contractor shall not be entitled to any additional payment for same.

**Contractor to make good defects.**

10. Lastly, the contractor shall as well after as before he shall have been paid for the said works and things, and without any further payment, for a period of one year after completion make good any defects whatever in such works and things, and especially in roofs or drainage of the premises, and the owner may retain a sum not exceeding (10) per cent. of the total contract price until the expiration of such period as a security for the performance by the contractor of this stipulation.

As witness, etc.,

**AGREEMENT WITH A BUILDER OR CONTRACTOR.**

A very short form, where the terms are embodied in the specification.

**Agreement by Contractor.**

1. The contractor shall execute, maintain, and do the several works and things mentioned and described in the specification or particulars hereunto annexed, and signed by the contractor and by —, the architect (surveyor) of the owner, and the plans and drawing referred to in such specification or particulars, in and upon the premises therein mentioned, within the time or times and in consequence of the payments to be made to him by the owner, as therein mentioned, and shall in all respects be bound by, perform, observe, and fulfil all the conditions, stipulations, and provisions expected or contained in such specification or

particulars, and which are expected or intended to be binding on and to be performed, observed, or fulfilled by the contractor.

**Agreement by Owner.**

2. In consequence of the premises the owner shall make to the contractor, the payments mentioned in the said specification or particulars at the respective times and in the manner therein mentioned, subject to the deductions, retentions, and abatements (if any) to be made therefrom as therein expected, and shall in all respects be bound by, perform, observe, and fulfil all the conditions, stipulations, and provisions therein contained, and which are expected or intended to be binding on and to be performed, observed, and fulfilled by the owner. As witness, etc.

[NOTE.—In our next issue we hope to publish the set of abbreviated conditions based on those of the Institute, and sent us by a correspondent.—Ed. I. B.]

**IMPORTS.****PORT OF DUBLIN.**

February 21, per Lord Londonderry, from Baltimore, 421 pieces staves, to order; per Aranci, from Connah's Quay, 73 tons bricks, T. Scott; 73 do., do., J. and P. Good; per Lady Wolseley, from London, 550 sacks cement, Monsell; 13 packages lead, H. Sibthorpe; 12 firkins do., Hoyte and Son; 3 do., do., W. Murphy.

February 22, per Penrhyn, from Newcastle, 335 tons cement, M'Naughton and Co.; per Velinheli, from Port Dinorwic, 100 tons slates, T. and C. Martin.

February 24, per City of Oporto, from Antwerp, 2 cases window glass, W. Martin; 101 do., do., J. Arigho; 63 do., do., Port T.S. Co.; 30 do., do., W. Collins; 12 do., do., D. Behan; 17 do., do., Dockrell, Ltd.; 2 do., do., A. and C. Taylor; 2 do., do., J. Cunningham; 146 do., do., Brooks, Thomas, and Co.; 2 do., do., A. Meyer.

February 24, per Brackley, from Connah's Quay, 130 tons bricks, T. Archer.

February 26, per Petunia, from Darien, 2,125 logs pitch pine, T. and C. Martin; per Lady Hudson-Kinahan, from London, 15 packages lead, Hoyte and Son.

February 27, per Kangaroo, from Glasgow, 140 tons clay goods, T. Archer; per Elizabeth, from Chester, 20 tons bricks, etc., T. Archer.

February 28, per Mayflower, from Orme's Head, 220 tons limestone, E. and J. Burke.

March 1, per City of Stockholm, from Rotterdam, 37 cases ironware, to order.

March 5, per Val de Travers, from Treport, 50 bags plaster, to order; per Kate, from Paisley, 110 tons bricks, R. Brown and Son.

**FIRE TESTS OF CONCRETE.**

Much difference of opinion undoubtedly prevails as to the value of various familiar aggregates for concrete to be used in fire-resisting construction. With the object of throwing light upon this question, an experimental fire and water test was undertaken in October last by the British Fire Prevention Committee. For the purpose of the investigation, seven floor slabs were prepared with the following aggregates—furnace slag, broken brick, broken granite, burnt ballast, coke breeze, furnace clinker, and Thames ballast. The proportions of the concrete were 1 part Portland cement, 2 parts sand, and 3 parts aggregate for all the slabs, except those in which burnt ballast and coke breeze were used, the proportions in these being 1 part of Portland cement to 5 parts of aggregate. Upon examination of the slabs after exposure to fire for three hours at temperatures ranging up to 1,800 degrees Fahrenheit, followed by the application of water for two minutes, the results were found to be very divergent, and in some cases decidedly unexpected. Those who desire full particulars will find them in the official report issued by the Committee, and we must content ourselves here with a brief reference to the chief lesson to be drawn from the test—that Thames ballast is an unsuitable and entirely unreliable material for fire-resisting construction. The slab made with this aggregate was cracked across in numerous places, and curved downwards about 2 in.; the under-surface exhibited had cracks in all directions, and much of the concrete was washed off by water. These results are in striking contrast to the evidences offered by the coke breeze and burnt ballast slabs, which showed no cracks either on the top or the bottom surface, were not curved downwards at all, and only suffered in places from the effect of the water application. Although the tests are by no means conclusive, they seem to point to the fact that intrinsically weak aggregates are better for resisting fire than strong aggregates.—*The Builder*.



## CORRESPONDENCE.

## ARCHITECTS IN PARLIAMENT.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR SIR,—I notice in your issue of February 24th, under "Topical Touches," you state that you have been unable to identify the six architects elected to the new Parliament.

You may be interested to know that the architectural profession is represented by the following six members:—Sir Edward Boyle, Member for Taunton; A. C. Morton, do. Sutherland; J. E. Sears, do. Cheltenham; T. B. Silcock, do. Somerset (Wells); A. W. Soames (retired), do. Norfolk (South); W. Tudor Walters, do. Sheffield (Brightside).—Yours faithfully,

C. M'ARTHUR BUTLER.

Staple Inn Buildings (South), Holborn, London, W.C.

February 26th, 1906.

## PROPOSED NEW FORM OF BUILDING CONTRACT.

Letter from the President of the Master Builders' Association to the EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—Your leader and Mr. Owen's paper in your last issue are both full of matter for thought to those who, up to the present, have been in a large measure left out of consideration, and yet to whom the subject is of more vital and continued interest than all others beside, viz., the Builders of this country. For while the public, in its individual members, may be now and again party to the conditions of a building contract, and the architects accessory to and interested in these agreements in a secondary capacity, the building contractor has, in almost all his transactions and during the whole course of his career, to be bound by conditions of contract with each of his clients. And the terms are those under which he carries on his business.

It has seemed therefore more than strange to many that the subject has been taken up by the R.I.A.I., and the new form prepared without any preliminary discussion as to its terms with those so vitally concerned (who must be parties to it to make it a contract at all).

Notwithstanding the fact that the reconsideration of the old form and the adoption of a more equitable one has been urged on the Institute for many years by the Builders' Association of this city, this action has been taken because of the want of uniformity in the forms used (several architects having different forms), and also because provisions are contained, in almost all, which are inequitable to the builder and have been withdrawn from the forms used for years by the architects and builders all over the Kingdom.

As you have pointed out in your excellent leader, it is a pity that, instead of being curtailed and simplified in its clauses, this suggested new form is much longer than the old. And to all appearance it will give rise to more disputes except, indeed, that all possibility of dispute is prevented by the simple precaution of tying up the mouths of those who might be at all likely to cause trouble in this direction.

This, indeed, appears to be the method adopted by the framers of the new document, if one is to judge from Mr. Owen's observations on the subject. For he says that "The critical study of the various forms of building contract which have been considered by the Professional Practice Committee during the last three years and the frequent discussion of the entire question, from the broadest general principles to minor details, both in committee and council, coupled with my own experience in practice, have led me to the conclusion that the most practical and best description of building contract—best, I mean, in the interests of both employer and contractor—is that which places the architect in supreme control, makes him sole judge, and his decision final and conclusive in regard to all questions relating to the execution of the works, the meaning of the drawings and specification, the quality of materials, and the nature and quality of the works to be executed, or already executed, while giving the contractor the right of arbitration in the event of dispute as to the quantity or valuation of deviations." He goes on further to say: "Such a contract enables a competent and straightforward architect to get his design properly carried out, together with any deviations which may be necessary, and to insure that the contractor receives just payment for the work done. It has been frequently argued that such a contract leaves either party very much at the mercy of incompetent or unscrupulous architects, etc."

Now it would appear that adoption and working out of the new form depends on the "competent and straightforward architect." Does it not also depend as much, and more, upon the competent and straightforward builder? And if these two be available where is the necessity for all the binding, penal clauses, which evidently have been so lavishly inserted? And it would be as reasonable to assume that all builders, as all architects, possess and exercise those qualities to the fullest extent.

I trust that it will not be advanced that the clauses are necessary because all builders are lacking in competence and straightforwardness.

Now, if one can give any credence to the statements quoted as facts in your leader "that drawings surveyors get to measure from are sometimes imperfectly thought out, or even carelessly and obscurely prepared, contradictory and impracticable, that the specification is on occasion full of padding and stock pattern verbiage, and discloses a lack of practical grasp of the subject dealt with and an inability to describe it clearly, simply, and so as to be understood by the ordinary man."

"Very often it does not exist at all, in which case some architects compel the surveyor to write it for them, thus doing their work, while others again will not permit them to write it but start off after all is finished, quantities issued and priced, to write a specification in order to enable a contract to be entered into, probably without even a conference with the surveyor, and often items are included that the surveyor never anticipated."

No sane man will contend that precautions and conditions should not be inserted in the contracts which are calculated to save the building contractor from such a state of affairs as thus made manifest, if these statements are correct, although such cases may be few.

But not many will aver that the architects of this or any other country are either immaculate or infallible, and are, in every individual case, fully "competent and thoroughly straightforward," the conditions precedent assumed by Mr. Owen as those which at all warrant the drastic course taken by the framers of the new form.

I do not propose to enter into any discussion on the proposed new form, which is not now before us, except so far as it has been revealed by Mr. Owen's paper and your leader. But the subject of quantities—responsibility for their accuracy and their being made part of the contract—are matters of vital interest to the building trade, and may be referred to by other letters. I will not further refer to them than to say that in very many contract forms they are included, in all the Scotch forms I have seen, in the War Office forms, in most of the English forms, where they are not embodied an option is given for their inclusion in the contract if the parties so desire and decide. This last method seems to me the most equitable, and would in a great measure settle the question of liability for inaccuracy in their preparation.

I regret this letter has run to such length, but the importance of the matters under consideration will, I trust, be ample excuse.—I am, sir, yours, etc.,

JAMES BECKETT.

## ARCHITECTS' APPROXIMATE ESTIMATES.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—Most of us have, from time to time, felt irritation at hearing it declared that it is the invariable rule that if a client names a certain sum to his architect as the limit of his proposed outlay on some building work, when tenders are opened the lowest received will be found to exceed this limit by at least fifty per cent. The charge is, of course, extremely unfair, but we all feel that some members of our profession are very careless in the preparation of their approximate estimates, and are thus responsible for the unfortunate character frequently given to members of our profession by the public. A client calling on me some months ago told me at our first interview that he had been warned to expect such an unfortunate surprise. I confess I felt not a little "nettled" but, on consideration, realised that the ordinary client, inexperienced in building matters, who has a strictly limited sum to expend, warned on all hands by others who had suffered, must approach his architect with an excusable lack of confidence. I told my client I would prepare a sketch plan of a house to cost £2,500. That was his limit of expenditure. I did so, and to my sketch attached an outline specification detailing thickness of walls, height of rooms, description of plumbing, grates, mantels, etc., and general particulars as to the nature of the materials I proposed to use.

I told him he would have to employ a quantity surveyor, whose fee would amount to a definite sum. That this liability he would have to meet, whatever the result of the tendering would be. Consequently, if the lowest tender far exceeded the amount he wished to spend, and the work was abandoned, he would have to meet the surveyor's claim without any advantage to himself, further than an added confirmation of his friend's opinion as to the unreliability of architects' approximate estimates. I further told him that I had sufficient confidence in my opinion in regard to the value of the house I had designed that I was prepared to back it. If, I said, the lowest tender exceeds my approximate estimate by 10 per cent. I shall forego the fees due to me for the preparation of plans and obtaining tenders, which, on the £2,500 basis, would amount to £75.

Possibly I was rash, and I confess to a considerable anxiety when opening the tenders with my client on Saturday last.

I have never in my experience met with closer tendering. Lowest £2,483, followed by £2,484 16s. (36s. difference). Then three contractors at £2,500 and one at £2,550.

I think I have vindicated the often assailed "approximate estimate!"

Would it not be well if we stood together in the matter and endeavoured to practically contradict the common impression which often, I think, drives clients from our doors? I consider this to be a matter of real professional importance.—Yours, etc.,

R. CAULFIELD ORPEN.

13 South Frederick-street, Dublin,  
February 19, 1906.

#### APPOINTMENTS UNDER LOCAL AUTHORITIES.

TO THE EDITOR IRISH BUILDER AND ENGINEER.

SIR,—While I hail the remarks of your correspondent, "De Silva," on my letter, which appeared under the above heading in the penultimate issue of your paper, I at the same time wonder whether he suspects the fallacy of his argument when he claims, which he virtually does, that because without special training Telford, Stephenson, and others of that ilk, became eminent engineers, we may take it as probable every man who can deftly handle a trowel or a screw-plate, is going to develop on similar lines or even by similar stages.

It is no more to the point to remind us how those men started life; it is obvious they must have started at something, and if he thinks there is any force in that style of argument he might have added, and, with equal cogency, that Isaac Newton himself "started life," which, presumably, he did, as a suckling baby, in common with all the congenital idiots who may have lived in his time.

He is wide of the mark when he represents me as sneering at a carpenter or mason, handy or unhandy, according to his distinction. Although I used the word "handy" in its conventional, not literal, sense, whereas I merely invoke ridicule on the principle, or rather lack of principle, which misplaces either, and elevates him to a position for which he may be utterly unfitted, and without having even formal regard to his fitness. As regards the man himself, if he "gets there" and can wear his laurels with equanimity at public, or for that matter, private, expense, I have only to say that his ingenuousness is to be admired, yet I cannot help thinking that his feelings must occasionally be somewhat analogous to those of a pickpocket in his "aliaa." Still less do I reflect on any "able and honourable class," for such would be downright inconsistency on my part, and diametrically opposed to the principle I favour, but also for the broader yet simple reason that "able" qualities and "honourable" ones forsooth, no man can afford to ignore. My contention in the main, as a re-usable of my former letter will show, amounts to nothing more than that the right man should be put in the right place, whenever such is practically possible; and that the chosen man should be at least equal to the task—and, *appropos* of this, there is an old French dictum which, translated, runs:—"Give the tools to the man who can handle them." This is, however, not identical with saying that the man who can make an indifferent offer at turning an arch should at the same time be an expert with the theodolite.

To my own knowledge the case of Telford is a stock instance put forward by impatient aspirants, and is even supposed by some unreflecting ones to be a standing proof that special training is not required for an engineer. Experience, however, shows the contrary to be the rule; but in any event a budding Stephenson or Telford is not readily mistaken for the counterfeit article—such men may always be trusted to take care of themselves and to fill their place with honour, for theirs was a case of decided genius—of the NATURAL engineer eventually, and, as a matter of course, becoming TITULAR engineer. But we would fain go one better and have the natural, aye, and the acquired, and the cultivated, subordinated to the titular. It is plain that such a principle is fundamentally sound.

Again, were we confined for every-day selection to that particular class, I fear, with all due deference to our eminent contemporaries, the supply would very soon run short, and as our question is an every day practical one, we must haul down our standard, yet while no man may fix an upper limit to the scale, it is within the power of all to fix a lower, and this latter is the crux of the whole question.

Your correspondent wishes to be told whether all engineers and architects are "above suspicion as regards professional ability." Whether they are or not, I can tell him this—the most certain way to ensure that they shall be, so far at least as is humanly possible, is to prevent those self-imagined Stephensons and Telfords, or other dilettante noodles, playing their pranks amongst a body of men who have taken the

trouble to obtain a rational grasp of their business. The question appears like an invitation to me to write myself down in what should prove a very foolish attempt to describe a touchstone by which to test them individually; but I did not break into these pages for that purpose, and I shall now retire by saying that if, in my former letter, I have proved piquant or sarcastic where I only meant to be mild, I am all the more pleased; for I naturally could not expect, still less did I anticipate, that my remarks would be welcomed by those whom the cap fitted. At the same time I am far from insinuating that such is the case with your worthy correspondent—Yours etc.,

FREE LANCE.

March 1st, '06.

P.S.—In my former letter a few errors of print and punctuation crept in, but as they merely weakened, but did not materially affect the sense, I have allowed them to go uncorrected.—F.L.

#### ANSWERS TO CORRESPONDENTS.

##### "Concrete Tanks."

"SIMPLEX."—In further reply to your query as to how to make underground sewage tanks fairly waterproof.

[The concrete for these tanks should be composed of 1 part Portland cement, 2 parts clean sharp sand, 2 parts coarse gravel (washed if necessary) and 2 parts broken stones (the largest to be 1½" in size). The concrete is to be mixed pretty wet and thoroughly well rammed with purpose made iron rammers between planned forms. Special care should be taken to use suitable rammers, as owing to the presence of Expanded Metal there might be difficulty in ramming as easily as in the case of plain concrete. When completed the tanks to be grouted inside and out with a good coat of grout. The concrete to be mixed in the following proportions:—2 measures of broken stones (the largest to pass through a 1½" ring), 2 measures of coarse gravel, and 2 measures of clean sharp sand, total 6 to 1, the last to be struck off with a straight edge, and 1 measure of Portland cement to be spread over it and again struck off with a straight edge. To be raked out with strong garden rakes and thoroughly mixed, plenty of water to be added from time to time through the rose of a watering pipe to bring the concrete to a "quaking" consistency, and the measures to be thrown in while freshly mixed. Care should also be exercised in regard to the bolting of the forms that the bolts are sufficiently frequent to keep the whole thoroughly firm and in shape. Of course if you wish to be certain that the tanks will be absolutely waterproof, the concrete should be mixed 4 to 1, and rendered in neat cement or cement with a small admixture of fine sand.]

##### Bad Foundations.

H. MURPHY.—You must calculate the weight of the superstructure, and spread out your foundation accordingly. Earth such as you describe will probably not bear more than one ton weight per superficial foot. A bed of concrete 18 inches thick, with a layer of "Expanded Metal," No. 30 gauge, will do what you want if you calculate the area on the foregoing basis. The metal reinforcement should be put in in the bottom of the footing to withstand the downward pressure, which puts the lower surface into tension.

#### THE LESSON OF THE CHARING CROSS ACCIDENT.

Iron members incorporated in a bridge or roof are fully exposed to climatic influences, except for the more or less inefficient protection afforded by a thin layer of paint. They can be inspected and replaced as occasion demands, and so the life of an engineering structure, whether of cast iron, wrought iron, or mild steel, may be extended almost indefinitely. In justification of this statement we may point to the cast iron arch at Ironbridge, now more than a century and a quarter old; the Menai Suspension bridge, with the respectable age of eighty-five years; the High-Level bridge at Newcastle, and the Britannia bridge across the Menai Straits, both in their sixtieth year; to the Crystal Palace, more than fifty years old, and to many other historic iron structures still enjoying a green and vigorous old age. The periodical failure of bridges and the occasional collapse of other engineering structures in the United States can be disregarded, because in one case the reason is inadequate strength for loads not contemplated by the original designers, and in the other risky design or faulty workmanship. What may happen some day to buildings which rely for strength upon embedded iron and steel columns and joists, no one would like to predict with certainty. When iron has been buried in brick walls it cannot be examined, repainted, or replaced like the members of a purely metallic structure. Brick masonry is by no means impervious to moisture, and it is not unreasonable to suppose that corrosion goes on to a very considerable extent in the metal concealed. We certainly believe architects would be wise to insist upon the protection of iron and steel members so incorporated in their buildings by something more durable than a mere coat of paint.—*The Builder*.



## THE KILLALOE SLATES.

The ordinary general meeting of the Killaloe Slate Co., Ltd., was held on Tuesday last. Mr. Oliver Fry, J.P., chairman, presided, the other directors—Messrs. Charles E. Tuthill, J.P., and Robert G. Parker, J.P.—being also present.

The report stated that the net profit, after providing for all trade charges, the payment of directors' fees, and loss on realisation of investment, amounted to £5 8s. 6d., to which was added unappropriated profits brought forward from 31st December, 1904, amounting to £5,136 7s. 3d. The total to be carried forward to next account was £3,141 10s.

The Chairman said—Gentlemen, it is not only with great regret, but it is also with feelings of disappointment that the directors meet you here to-day. In developing the quarry, and following the cleavage of the slate rock it was found that a considerable amount of unprofitable material had not only to be quarried out, but also had to be removed. The increased expense caused by this had absorbed the earnings of the past year. As the report in your hand states the sales were maintained, and a stock of slates was held so that all urgent orders were fulfilled without delay. Here let me take the opportunity of thanking the Society for the Development of Irish Industries for the great interest they have taken in our quarry, and in helping us to keep employed the 200 men, our staff, working in the slate industry, and also for the special efforts the society made to secure for us the order to cover the Glasnevin Training College. This order, I regret to say, we did not succeed in getting, although the late Chief Secretary promised Mr. William Field, M.P., in the House of Commons that all Irish material would be used in the structure where possible. Now we all know that Killaloe slates are second to none both for durability and texture, and also it is common knowledge that many of the finest buildings in this city and the suburbs are covered with Killaloe slates. Therefore, I think I am entitled to say that our slates would have been quite good enough for the Glasnevin Training College, and I venture to think, too, that had our slates been used in connection with that building there would have been a saving of several hundreds of pounds to the Board of Agriculture. This Board, I was under the impression, was supposed to help Irish industries, but I regret to say that my experience in the instance referred to leads me to doubt my first impressions. There is nothing in the balance sheet which I think calls for special comment at the moment, but I can assure my fellow-shareholders that no effort is wanting on the part of the board to protect the interests which are in our hands, and to further the advancement of this useful industry in this our country. I now formally move the adoption of the report, expressing the sincere hope that this time next year we will be in a better position, and able to resume payment of a dividend.

Mr. R. P. Gill, C.E., Nenagh, rose to propose an amendment. He said the figures in the report of the directors for 1905, taken in juxtaposition with the figures for 1904, disclosed an extraordinary state of things, and an immediate explanation was required, not only from the point of view of the shareholders, but from that of the public at large. He pointed out that the investments of the company in 1905, as compared with 1904, showed a diminution to the extent of about £1,000. In 1905 the liabilities of the company amounted to £512 15s. 2d. The only thing to show against this was a sum of £1,548 14s. 11d. stock on hands. Why was there more than one thousand pounds worth of stock on hands? There had, he contended, been no effort made, either by advertising or canvassing, to press the members of the public who would be likely to buy these slates. One member of the directorate had done everything possible to push the business of the company, and he was Mr. Fry. The company had a magnificent property, but it was not properly developed. He asked to be told the special recommendations the new manager had. The speaker went on to criticise in strong terms the management of the company. He asked for further information in connection with the additional salary of £20 a year, which was voted two years ago to the directors.

The Chairman—That was a voluntary bonus, proposed, seconded, and passed unanimously by the shareholders. It was not appropriated by the directors themselves.

Mr. Gill went on to ask why 60 or 70 men had been dismissed from the quarries. He concluded by moving an amendment to the effect that the consideration of the directors' report be adjourned until full inquiry would be made into the working of the quarry by a committee of shareholders.

The Chairman, in reply to the statements made by Mr. Gill, referred to the manager of the quarry, Mr. Owens, and said that for some time they had felt that it would be a great advantage to have a practical man who was acquainted with work in a large quarry, and that was why the present manager, who came from North Wales, was selected.

He was paid £130 a year and a bonus on the profits. Personally, he had never heard anything of Mr. Owens but as a fair and reasonable man to work with. Speaking on the question of directors' fees, the Chairman said that human nature was human nature, and the most anxious times were when the company was least prosperous. About twenty men had left the employment of the company, but they did so voluntarily.

Mr. Gill—I asked Mr. Owens last Saturday why they were dismissing men, and he said—"Because we have no money to pay them."

Mr. R. D. Bolton spoke of the present competition from Continental and American sources.

Mr. Hutton (of Brooks, Thomas and Co.) said his firm had never had any trouble in getting slates from the Killaloe Slate Company.

The report submitted by the directors was, finally, adopted, and Mr. Gill consented to substitute a resolution for his amendment, to the following effect:—"That this meeting stand adjourned until a full inquiry is made into the working of the quarry by a Committee of Shareholders, who will report to a meeting to be held on the 4th April next."

## ULSTER SOCIETY OF ARCHITECTS.

A general meeting of the members of this society was held at 13 Lombard-street, on the 23rd ult. Amongst those present were:—Messrs. J. J. McDonnell, J.P., President (in the chair); F. H. Tulloch, J.P.; W. J. Gilliland, R. M. Young, J.P.; W. J. Fennell, Henry Seaver, N. Fitzsimmons, H. Lamont, C. M'Cord, S. J. M'Avoy, T. W. Henry, J. E. Armour, W. C. Maxwell, and W. Hartley Patterson (Honorary Secretary). Letters of apology were received from Messrs. W. J. W. Roome and W. B. Fennell. Mr. W. J. Gilliland, F.R.I.B.A., reported on the progress made by those having charge of the "Enrolment of Architects Bill," and gave a resumé of the evidence given by him on the 31st ult. before the Commission appointed by the Royal Institute of British Architects. The amendments to the society's conditions of contract (inserted at the instance of the Master Builders' Association) having been fully considered, a resolution adopting the "conditions" as amended was proposed by Mr. H. Seaver, seconded by Mr. W. J. Fennell, and passed unanimously. Correspondence was read relative to the bye-laws proposed to be made by the Belfast City and District Water Commissioners fixing the capacity of cisterns; also as to the employment of an engineer for architectural work in connection with asylum buildings, and the action of the council was, after discussion, approved of. The chairman of the Joint Art Committee reported on the success of their efforts in promoting an art exhibition in Belfast. This, he hoped, would be opened to the public early in April, and from the promises of support which they had received he was satisfied the undertaking would be an unqualified success. He also referred to the munificent bequest to the city by the late Sir R. Lloyd Patterson, D.L., of all his pictures and a sum sufficient to erect a suitable art gallery to contain them. It was announced by the president that the annual exhibition of prize drawings of the students of the R.I.B.A. would be held in the art gallery of the public library (kindly lent by the committee), beginning on Monday, 19th March. Reference was also made by him to the council's action upon the "Easement of Light Bill," which, it was hoped, would be dealt with in the present session of Parliament, and also to their efforts in establishing a closer professional *entente cordiale* with the members of their society in Derby and other Ulster districts. After the transaction of routine business, the meeting terminated.

The Gilmour Door Co., Ltd., 53 Berners-street, London, W., have appointed Messrs. Brooks, Thomas, and Co., of Sackville-place, their agents for Dublin and district. They have fitted up at their showrooms an exhibit, which we lately inspected, of these doors. They include a make of hospitable admirably adapted to its special purpose, and frequently specified by English architects. The exhibit is of quite an interesting character, and well worthy an inspection by architects and building owners, a feature being the peculiar construction which permits of an absolute guarantee against shrinkage being given to purchasers. Another feature is that a hard wood door can be bought at a price astonishingly low to those accustomed to the cost of manufacture of hard wood stuff in this country. The patterns are almost without exception good in design, the molding, usually the weak point of "stock patterns," being very good and refined. In fact the "Gilmour doors" are as different to what is ordinarily described as "stock pattern doors" as chalk is to cheese. In addition to stock, the Company make doors to any design, and architects can get a quotation from Messrs. Brooks, Thomas, within 48 hours of submitting a sketch.

## REVIEWS OF CATALOGUES.

Messrs. Arthur L. Gibson and Co., Tower-street, Upper St. Martin's-lane, London, W.C., who are sole manufacturers of the Kinnear Patent Steel Rolling Shutters, send us their catalogue describing these and other specialties of the firm. The Kinnear shutter was introduced into this country some four years ago, and its excellent qualities have enabled it within this short period to achieve enormous success. Rolling shutters have, of course, been in use for a very long time, and when made in iron or steel are formed of separate slats which are connected by hinges. In the Kinnear shutter the slats are rolled out of light sheet steel, and are of such a section as to secure the utmost strength and rigidity with the least possible weight. An excellent feature is that the edges of the slats are rolled so as to form an interlocking hinge throughout their length. This gives extreme flexibility, and facilitates the replacing of slats in the event of their being damaged by accident. Malleable iron end-locks are attached to the slats to prevent lateral movement, and they also provide an excellent wearing surface. The peculiar construction of the Kinnear



High Street, Conway a Picturesque old Inn.



Conway Castle from the Suspension Bridge.

shutter has been proved by exhaustive tests to render it of great value for fire protection. The slats, being free to expand individually, can be exposed to intense heat without buckling the shutter as a whole. These shutters have been very extensively used throughout England for tramway depots, and when required for this purpose can be fitted with a patent trolley wire connection, so devised that when the shutter is raised a continuous track is provided for the trolley wheel. In Ireland, Kinnear shutters have been fitted in the following places: At Woodbrook, Bray, 3 shutters in a new motor garage; at Derry, shutters for the General Post Office; in Dublin, 2 shutters for the Office of Public Works; at Hollybrook House, Skibbereen, 9 shutters for windows, etc. Messrs. Guinness have also used Kinnear shutters, not for their premises in Ireland, but for their bottling stores in Liverpool. This catalogue also contains illustrations and descriptions of Messrs. Gibson's B. and S. Patent Folding Gates and Wrought Iron Grilles; hand-power lifts, patent interlocking rubber tiling, Cabot's insulating and deafening quilt, Cabot's creosote stains and Cabot's brick preservative. The catalogue may be had, post free, on application to Messrs. Gibson at above address.

An interesting booklet just to hand is that issued by the Sturtevant Engineering Co., Ltd., 147 Queen Victoria-street, London, E.C., and dealing with the Sturtevant system of ventilating and heating. This system, which is a mechanical one, operating by a forced circulation of pure warmed or, if need be, cooled air, is very fully explained. The air pressure is attained by the use of a power-driven fan, and the air is either drawn or blown through self-contained heaters of an unique and very efficient type. The entire heating apparatus is centrally located (with regard to the building to be warmed) enclosed in a fire-proof casing and placed under the control of a single individual, there-

by avoiding the possibility of damage by leakage or freezing incident to a scatterer system of steam piping and radiators. Absolute control may also be had over the quality and quantity of air supplied. It may be filtered and cleansed, warmed or cooled, dried or moistened at will. As regards the fan system it is now well established that the more crowded a room the less easy does it become to secure adequate supply and distribution of air without the use of fans. Ventilation by their means has the following great advantages: (1) Practically unlimited quantities of air can be supplied; (2) the supply is completely under control and, therefore, absolutely reliable; (3) the incoming air can be warmed, moistened, and filtered; (4) dust and fumes can be eliminated at or near the points where they are given off. We must, however, owing to want of space, refer our readers to the booklet in question for a full description of this excellent system which has been adopted by many of the best architects after the most careful investigation and installed by firms whose names are famous throughout the world.



Conway Bridge at entrance to the Town.



**The Acme Ventilating and Heating Co.,** of 35 Tarleton-street, Liverpool, issue a number of leaflets illustrating their specialities, which are of a most up-to-date and varied description suitable for every condition and circumstance. They comprise a great number of wall and roof ventilators, louvred turrets, cowls, and chimney pots and fans, the latter being suitable for electric, steam, or other power driving or by a spring arrangement when power is not available. The "Acme" systems of warming public or private buildings are of the most modern types, consisting of high or low pressure, hot water, or steam and radiators, and also the latest improved hot air system. All are specially designed to afford proper ventilation without inducing draughts. The company are prepared to submit estimates from rough sketches, plans or written details, or if necessary will send an expert to take particulars, charging only his travelling and out of pocket expenses. Catalogues and full particulars are obtainable from the company at the address named.

## REVIEWS.

### The Model Village and Its Cottages: Bournville.\*

A very charming little book, under the title of "The Model Village and Its Cottages," has just been published by Mr. Batsford. We use the term "charming" advisedly, for no architect who takes the trouble to peruse its contents will deny its claim to that attribute. Its author is Mr. W. Alexander Harvey, of Birmingham, who for the past ten years has acted as architect to the Cadbury Estate, or Bournville Trust. The Bournville Village is the outcome of the desire on the part of Mr. George Cadbury, cocoa manufacturer, to see his workpeople comfortably housed in good country surroundings. The factories lie about 4 miles outside Birmingham, and the project afforded an unique opportunity of establishing what is truly described as a model village. The cottages shown are illustrated by plans, elevations, and photographs of executed works, and all are from Mr. Harvey's designs. Some of the plans are most ingenious and economical of space, and well repay close study. Every cottage at Bournville has a bath with hot and cold supply, and some of these are very cleverly arranged to avoid occupying valuable space. The cost of many of the designs is given, and to Irish readers they will appear surprisingly moderate. However, few readers in this country would call a dwelling containing two sittingrooms, bedrooms, dressingroom, scullery and pantry with a hot and cold bath, a cottage! But doubtless these houses are intended for foremen or other higher employees.

Every house has a good garden, in no case less than 600 superficial yards, or about half a rood statute, not a very princely estate, but one which seems to have absolutely astounded some English critics by its extent, yet it is quite enough for a workman employed all day in a factory to profitably cultivate. As a matter of fact, the gardens are made the fullest possible use of.

The greatest feature of this work, taken in conjunction with the good and economical planning, and the moderate cost of the houses, is the charming, restful, and artistic character of the designs, all sufficiently diversified in outline and material to avoid monotony. The photographic reproductions of the executed work show some beautiful views, quiet, and in every respect thoroughly appropriate; the reproductions themselves reaching a very high level of artistic excellence, that shows Mr. Batsford has, as usual, produced the work with no niggardly hand, particularly as regards illustrations. Taste and economy of construction are fittingly exemplified and shown at Bournville. The plates number 58, including 38 views beautifully reproduced from specially-taken photographs. Beginning with rows of eight cottages, the author illustrates blocks of three, four, and two cottages, as well as single cottages and some larger houses, and a few delightful little interiors.

The notes of practical character given are most helpful and practical, being the outcome of Mr. Harvey's really unique experience.

In some of the kitchens the walls are simply pointed for whitewashing, with a four foot high painted dado. A feature is the good size of the rooms, the usual height of which (8 ft. 3 in.) is abundant. Throughout substantial, permanent materials are used—brick, either in the form of exposed facing or rough cast, being employed for the internal walls. The rents range from 4s. 6d. to 12s. a week, and at Bournville there is always a demand for houses on the part of the skilled artisan and also from clerks and others, which we do not wonder at, so pleasant do the houses look. 50.7 per cent. of the inhabitants are factory workers, 36.0 artisans, and 13.3 clerks and travellers. Of course, these include many persons other than Messrs.

Cadbury's own employes. Simplicity and regularity of planning have been aimed at throughout; the roofs and eaves (set out at right angles) running uninterrupted from end to end in all the simpler blocks. Mr. Harvey declares the sound principle that beauty should be based upon utility, a principle too often violated even in small cottages and villas, in order to gratify the vulgar love of shoddy and meaningless display; but he tells us, too, that "public taste may after all be found to be more amenable than is commonly represented," a saying in which there is much truth.

Unhappily space does not permit of our giving our readers many of Mr. Harvey's best bits of practical advice, for he is evidently a man not alone full of love for the task he has had in hand, but is also possessed of much practical common sense, and altogether the cottages shown afford in their solidity of construction a welcome contrast to the jerry built, flimsy structures so many designers have of late sought to fling upon the public under the guise of "cheap forms of construction."

In matters of detail there is much useful information. The question of suitable furniture is dealt with. Casements are advocated in preference to sashes—right, no doubt, from the picturesque point, but hardly suited to this country. Fantastic ridges of vulgar finials are anathematised.

Mr. Harvey in this work shows what great results can be obtained in the laying out of a model village, and what pleasant features the cottages may be made. The book merits the careful study of architects—not alone those engaged on the village architecture or dwellings for the labouring classes, but also of those confronted with the problem of how to produce artistic results when developing a small building estate where economy is the order of the day, to such it should be an excellent stimulant in design and an incentive to do their level best.

We reproduce as a Supplement to our current issue four of Mr. Harvey's designs.

## THE ECONOMIC DESIGN OF COLUMNS AND BEAMS.

By MR. W. E. LILLY.

The following is an abstract of a paper read before the Institution of the Civil Engineers of Ireland, on the 7th inst., by Mr. W. E. Lilly, Hon. Secretary of the Institution:—

The proportions adopted in the design of beams and columns for engineering structures are, to a large extent, empirical. This is inevitable when it is considered that in many cases problems are propounded which in the present state of our theoretical knowledge no real solution can be given. The designer under such conditions must fall back on his own and other experience to determine the proportions which seem most suitable under the circumstances, and it often happens when judged by a more complete knowledge of the problem that the proportions adopted are what theory would indicate. The proportions of columns are a case in point; so far as the author is aware no complete solution has been given to the question "given the load and length of a column what are the best proportions to adopt?"—that is, how to ascertain the dimensions of a economic column, or one in which the material may be disposed to the best advantage.

During the past two years experiments have been carried out on mild steel tubes in the Engineering Laboratory of Trinity College, Dublin, to investigate this point, which have yielded some interesting results. A detailed description of these experiments and some of the conclusions derived therefrom was published in the Proceedings of the Institution of Mechanical Engineers, 1905, and in "Engineering," July 14th, 1905. It was then pointed out that it was important to consider the failure of a column by secondary flexure as well as by primary flexure, and that the strength of the column depended on both these kinds of flexure being taken into account. Further experiments are now given and referred to. These experiments show that under certain conditions wave forms are produced, and that these wave forms have an important bearing on the limiting load which short columns can support. Further, it is shown that the analysis of these wave forms can be simply expressed and leads to a modification of the formula in general use for the design of columns. A modified formula derived from the theoretical considerations is then given, which takes into consideration both primary and secondary flexure and which gives good values when compared with the experimental results. A derived formula is also given from which the economic proportions of the columns can be determined. The work of other experimenters is also alluded to and their results compared with the values obtained from the modified formula. The influence of secondary flexure on the design of a circular hollow beam is then considered and a modified formula given, also a derived formula for the design of beams in practical use is remarked upon, and some criticism offered.

\* Just published. Large 8vo (C in. x 7 in.). Art. linen, gilt edges. Price 8s. 6d. net. By W. ALEXANDER HARVEY, Architect.  
London: J. T. Batsford, 94 High Holborn, 1906.

Illustrated by fifty-seven plates, thirty-eight being views from photographs specially taken, and nineteen plans and details, including some illustrations in the text; with an account of the village and a description of its cottages, also numerous notes on cottage building and the laying out of model villages.

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### A HOLIDAY RAMBLE WITH A CAMERA.

At the last meeting of the members of the Architectural Association of Ireland, Mr. P. J. Lynch, M.R.I.A.I., Limerick, delivered a lecture, entitled "A Holiday Ramble with a Camera"—in other words, an interesting discourse on the history, antiquities, and architecture of portions of Devon and Cornwall, recently visited by him. In his opening remarks, Mr. Lynch, referring to the somewhat discursive character of his lecture, explained the necessity for the student of architecture to make himself acquainted with a variety of subjects outside the A.B.C. of the profession. In support of which he quoted from a report of a lecture delivered to the students' class of the R.I.A.I. by the late James H. Owen, architect, their hon. sec., published in the *Dublin Builder* for 1865, in which he dealt on the importance of such general information. History was one of the subjects to which Mr. Owen referred. His words were:—"Our art is history. In it are preserved almost the only traces, certainly all that have anything definite and precise in them of those great earlier monarchies, which had passed from the world before the dawn of early civilisation. . . . Within the present generation the long-silent temples and tombs of Egypt have given us whole chapters of Egyptian history, and the excavations at Nineveh are revealing to us glimpses of a history stretching back to the time when Abraham left his own people and his fatherland. . . . By the study of history you will be better able to trace out, and feel as it were, the development of Architecture from those early and very simple buildings." *En passant*, Mr. Lynch noted the interest taken at that time—as disclosed in the file of *THE BUILDER*—by the R.I.A.I. to acquire rooms to form the nucleus of a Library and Museum for the students, the contributions to the latter to be chiefly from Irish manufacturers, so as to encourage native industry, remarking how history repeats itself while great bodies move slowly. Continuing, the lecturer stated that Archaeology cannot be separated from History. The remains which engage the attention of the antiquary are but landmarks of history, and to the Irish architect a careful study of the antiquities of his country, leading up to the perfection of ancient Irish art, is all-important. In this way alone will he succeed in breathing an Irish spirit into his art. The Belfast Cathedral and some other works he could mention should prove that this is more than a hopeless dream.

Geology is another subject a knowledge of which is very essential to the architect, and in this connection the Devonian and granite formation of this district are most interesting. The early history of Cornwall is part of the history of the great Celtic race, who overran Europe and conquered Rome about 396 B.C. The first invaders of Britain, or the "Goidelic Celts," are now represented by the Irish, Scotch, and Manx peoples. The second invaders, or Brythonic Celts, have their representatives amongst the inhabitants of Brittany, Wales, and Cornwall. There were other invasions of Cornwall which have left a more lasting mark on its history and antiquities, and these were of Irish monks and adventurers in the 5th and 6th centuries—one Irish monarch, Muirchreach Mac Erc, A.D. 533, styled himself King of the Britons, Franks, and Saxons. It is in this body that the Oratories, Cashels, Crosses, and other Christian antiquities bear such a resemblance to those of our own country. Borlase, a distinguished Cornish antiquary, states that Professor Max Müller once said to him, "If you want to understand your antiquities thoroughly you must visit Ireland." Having shown on the screen some interesting photographs a round the Falmouth district, including some fine views of the modern Cathedral of Truro, the lecture continued through Penzance to the Isles of Scilly. The scenery of the isles was illustrated, but particular attention was paid to the

#### prehistoric remains on Isles of Scilly.

These consist principally of the remains of tumuli, the greater portion on St. Mary's; some as they stand, with the covering removed and the inner chamber exposed, would be called cromlechs, or dolmens. In the Scillies there is no doubt that they were all covered over. In many cases the line of the original circle of the mound can be traced. One mound with the passage and inner chamber remains fairly perfect, as shown by a plan prepared for illustration. This mound was of the Neolithic period. In studying archaeology comparison is all important, and in this connection the plan and section of the great Irish passage tomb at New Grange, which is of the Early Bronze age, is an interesting study. The architectural student will not fail to notice in this rude, dome-like chamber, with its passage, the prototype of the tomb of Atreus in the remains of Early Grecian art—associating all with that ancient *cultus* of the dead, which has survived in the Shinto worship of the Japanese of the present day. Photographs of a May Day festival at St. Mary's fit in appropriately as a survival of the Pagan feast of *Beltine* (Bels' fire), when fire and sun worship were practised by these Celtic people.

#### Early Christian Antiquities.

The early Christian antiquities consist of some few oratories, many holy wells or primitive baptistries, and a great number of

crosses. The Penzance cross—now in the Public Gardens—illustrates the characteristic type of Cornish cross, or wheel crosses, as they are called. Mr. Romilly Allen states there were no specimens of wheel crosses in Ireland, but a cross near Old Connaught, Bray, recently brought under notice by the Royal Society of Antiquaries, is of the same type as most of the wheel crosses of Cornwall. The cusplings within the circle, said to be peculiar to Cornish crosses, is illustrated in the remains of a cross found at Monaincha, Co. Tipperary. The lecturer described views of crosses at Mylor, Sancreed, St. Columb Major, Lanherne, and others, none of which approached the beauty of the standing crosses in Ireland, views of which were shown. This superiority was not altogether due to a stay to development, but rather to the art instinct in the Gael being superior to the Brython.

The line of progression in the outlines of the standing cross, from the inscribed cross and circle on the rude slab up to the finished form of the Irish standing crosses, can be very well studied in Cornwall, from the great number and variety of crosses remaining, over 300 of which have been illustrated by Langdon.

#### The Holy Wells in Cornwall

form an interesting link between Pagan and Christian times, and appear to be better cared for in some cases than any in this country. One, at St. Madron, was incorporated in a building of the oratory type, portion of which still remains, with its altar and stone benches, and formed, no doubt, the primitive baptistry of this early Irish missionary. St. Neot's, St. Breward's, and St. Cleer's Well all form interesting landmarks, while St. Keyne's, with the valuable virtue with which it is said to be endowed, is a well to be preserved for all time.

Passing through Plymouth, Torquay, and other picturesque places, there is nothing of surpassing interest until Exeter is reached.

#### Exeter.

Exeter is a city of great interest to the artist, antiquary, and architect in its picturesque streets, ancient history, and fine cathedral. The Guild Hall, High-street, Mole's coffee house, are views to notice. The Cathedral, as compared with other English Minsters, cannot be said to be imposing, but it has beauties all its own. The west end, though presenting somewhat of a squat appearance, is worthy of study, particularly from its peculiar construction, its fine decorated window, and the vigour of some of its statuary, particularly the mid statues, which modern writers consider to date from about 1345, which is somewhat earlier than previously supposed.

The fine Norman tower (1117) gives great force to the design, though the sense of united harmony derived from a central tower is lost.

The interior view is very pleasing, its uniformity, the long vista, and the excellence and variety of detail give it a peculiar charm. It has been criticised for being too low, but it is scarcely fair to criticise a thing of beauty. The decorated portion, into which the old Norman building was converted, dates from early in the 14th century. The tracing of this period is very fine.

The wood-carving of the Bishop's throne and the misereres, the stone carving of the sedilia, some of the early English work in the Lady Chapel, and other corbels of the nave were all noted, and various views in the interior shown, and a high eulogium on Exeter Cathedral brought a very instructive lecture to a close.

A cordial vote of thanks was proposed by Mr. C. Ashworth, and seconded by Mr. J. H. Webb, and conveyed in flattering terms to Mr. Lynch, who suitably replied.

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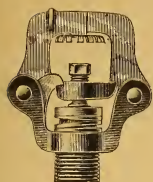
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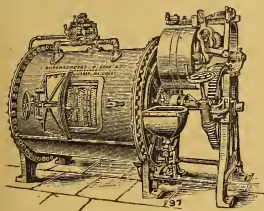
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## THE ECONOMICS OF BUILDING.

A very interesting lecture was that delivered by Mr. J. W. Stewart before the Architectural Association of Ireland the other night. Mr. Stewart gave his audience the view of the question of cheap housing for the working classes from a builder's or building owner's standpoint. By means of the lantern he showed many plans of houses for working people in towns, many of them most ingeniously planned, so as to make the utmost of the available space. The houses were, Mr. Stewart remarked, all designed by qualified architects, and had been erected for the sums he mentioned as he showed each. Mr. Stewart gave his hearers many practical tips, and contrasted the old method of carrying out a building with the new. Only calculating everything to a nicety so as to avoid waste could the building of this class of property be made to pay. He laid stress upon the importance of clear and full drawings and details, and said that speculative builders would find it profitable to pay an architect, and to pay him well, to make such drawings in all their fullness. He mentioned that things had greatly changed in the trade in Belfast even in his own time: then the custom was, if a foreman ran short of joists, for him to requisition a load, and a load accordingly was sent. Now the practice is to prepare full and complete drawings of each room, showing every joist in position, and even making allowance for the short joists against trimmers; then if a foreman wanted more joists a builder would ask where the others had gone to, the length of each and its position in the building being

figured out beforehand. Much might be saved in this—ten per cent. in labour he estimated—because the work could all be done in the shop. Similarly Mr. Stewart advocated standardisation of scantlings, of doors, of windows and roof pitches, and so on. Owing to the want of system it was incredible the waste of time that resulted due to alterations and fitting. Of course few architects would like to see standardisation carried too far—as, for instance, a hard and fast roof pitch—but there is no doubt that for the class of property Mr. Stewart described such modern up-to-date methods have much to commend them, especially from the economic standpoint. In concluding, Mr. Stewart deplored that the building of this class of house was to a great extent passing out of the hands of the architects and regular builders into those of a class of house-erectors, and he advocated combination amongst the architects and builders to see whether this trade might not be brought back into its legitimate channel.

Mr. John Good, in the course of an extremely able speech in support of the vote of thanks, detailed some of the disabilities that regular contractors labour under, as distinguished from the later day "House Erector." The latter buys his materials in the cheapest market, and is not above purchasing a lot of damaged or defective materials—bad cement, sappy timber—he sub-lets "to the top of his bent"—to one man he lets the foundations (made of his own bad materials), to another the brickwork at a starvation price, to a third the plastering, and so on, *ad infinitum*. The result is that, by using inferior material and poor labour (he uses ready made imported doors and sashes), he can thus work far cheaper than the master builder who is hampered on the one side by the regulations of the trades, and on the other by the architect's requirements.

If the master builder attempts to use an imported door his men strike, if he tries to adopt piece work, ditto, yet the same bricklayers will do piecework for outsiders. Mr. Good said architects had their remedy in registration, but the builders had none. They never could hope to compete with the jerry-building, speculative house erector. Another speaker (an architect), echoing Mr. Good's remarks, said he knew of an instance of a man, a retired butcher, who employed him to design a terrace of houses, who, when asked what contractors he would like to tender, said "none," he would build the houses himself. He did so, with success, and sold at a profit, and is to-day engaged in building as a "building contractor." The simple explanation is, he farmed out every item of work, and watched every detail of labour and material as put in place. What chance has the master builder against this—simply none.

The only thing open is for architects "to study the market," for contractors to accommodate themselves to altered conditions and beat the enemy on his own ground.

## COMMENTS.

### The Proposed New Conditions of Contract.

We publish in this issue a letter from Mr. James Beckett, the esteemed president of the Master Builders' Association, one of the oldest and most respected members of the building trade in Ireland. In his letter he sets forth the views of the Master Builders of Dublin in respect of the proposed new "Conditions of Contract." Our correspondent not alone, as we have said, occupies a very influential position in the trade, so much so that his views are entitled to the most serious consideration, but he is well known as a

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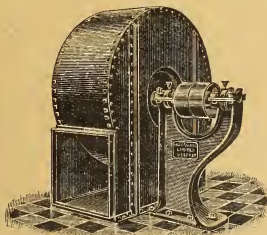
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man of moderation and of equitable mind. In every controversy in which opposing interests conflict there are to be found extremists whose stated opinions usually do more harm than good: our correspondent is not of such. Therefore his letter is entitled to the greater weight. We are surprised to learn that the conditions of contract have been formulated without reference to the Master Builders, and that is, in our opinion, a mistake, for no contract can be regarded as equitable or productive of enduring results that is not accepted, in the beginning at all events, by both parties to it, as a fair statement of their compact, nor can good and smooth results be hoped for if one of the parties enters upon it under a feeling more or less bordering upon compulsion. Such a contract is bound to lead to friction. To our mind, to frame a truly effective and enduring contract, and one that conserves in all its fulness the architect's ultimate authority, it is essential that the builders should be willing parties thereto.

Our correspondent agrees with us in deploring that the new form is even longer than its predecessor, and is more likely to lead to misunderstanding by reason of its great length and voluminous detail, providing for every possible or impossible contingency.

On the other hand, he is somewhat wanting in clearness in not stating more exactly what are the precise terms of the contract that the master builders object to in either the new or the old forms; and what *practical* value, if any, they attach to the arbitration clause apart from the sentiment of the thing. Truly enough, if architect and builder are both of them competent and straightforward, the need for penal clauses is reduced to a minimum. There are just as likely to be incompetent architects lacking the quality of straightforwardness as builders, and the ideal contract should protect the one against the other; but our correspondent will not, we feel certain, at the same time refuse to accept the dictum that the architect should be, and indeed must be, the supreme controlling authority. He has conceived the design, and must see it fairly carried out as between client and contractor: to do so he must have adequate powers. No sane architect would, we take it, assert that architects are infallible, therefore the object of any revision ought, apart from clearing up mysteries of verbiage and seeming inconsistencies, to be to devise a form which, while securing to the architect adequate and full control, yet protects the builder against unskillfulness or dishonesty, and what is more important because more common want of "back-bone." We are of opinion most decidedly that the contractors should be consulted as to the equitable framing of the conditions which will in the majority of cases be presented for their acceptance, especially, as our correspondent points out, such matters are the ordinary life's work of the builder while but of occasional importance to the client or architect.

Our correspondent, moreover, somewhat misunderstands us when he quotes from our article—

that the drawings surveyors get to measure from are sometimes imperfectly thought out, or even carelessly and obscurely prepared, contradictory and impracticable, that the specification is on occasion full of padding and stock pattern verbiage, and discloses a lack of practical grasp of the subject dealt with and an inability to describe it clearly, simply, and so as to be understood by the ordinary man.

Very often it does not exist at all, in which case some architects compel the surveyor to write it for them, thus doing their work, while others again will not permit him to write it, but start off after all is finished, quantities issued and priced, to write a specification in order to enable a contract to be entered into, probably without even a conference with the surveyor, and often items are included that the surveyor never anticipated.

We simply made this statement as setting forth a part of the surveyor's case as to why *he* should not be held responsible for the accuracy of his quantities; not as describing a usual or even an occasional case. So far as our own experience goes, such cases are, in Dublin at least, extremely rare. To require a surveyor to write the specification, or for the architect himself to draft it after the quantities are taken out, is not in itself wrong; in fact, both these alternative courses are advocated by many

authorities. We simply denied that architects and builders before joining in entirely condemning the surveyor should try to place themselves in his position and hear his case before deciding. We trust that the publication of this letter may result in such a conference as will lead to the adoption of a form of contract acceptable alike to architects and contractors, while safeguarding the interests of the employer who has to pay both. What are the architect's functions? He is in the first instance retained because of his superior practical and artistic skill in design, and in the second, to see that his design is carried out in all its fullness as contracted for. To rate him as a spy upon the builder's actions or as the creature of the employer is to degrade his functions. An independent clerk of works would be far more effective as an employer's agent pure and simple. The architect, on the other hand, has a judicial function to discharge that often calls for the exercise of the highest personal qualities if he is to act fearlessly and independently.

#### Architects' Approximate Estimates.

Mr. R. Caulfeild Orpen sends us a very interesting letter. We entirely agree with every word that he says. Personally, we have never had the slightest difficulty in making a reasonable approximation, and in cases where we have had the help of the surveyor as well, we have always felt absolutely confident and have never yet been seriously out. An architect of our acquaintance recently priced the quantities for the shell of a large church, an £11,000 job, and he was only about £150 over the lowest estimate. We are also with Mr. Orpen as to the bad effect of architects giving careless and haphazard approximate estimates. While it is a fact that very few architects have any great practical acquaintance with pricing, it is also true that it is not so difficult to get help and advice from experienced builders and surveyors, and with a little practice it is astonishing how well one is able to size up the value of a given building, particularly if it is in a line of which one has had special experience. The real root of the difficulty is that architects too often encourage a client in his desire to get £1,000 worth for £600, and that is what it amounts to; they often and often sit down, and instead of cutting the thing as fine as possible, put in a lot of stock phraseology in the specification and certain accepted requirements, which tend to swell the cost, but which might be modified if architects were not so tied to convention. The mischief is, as Mr. Orpen says, that clients are driven from one's door. We have known several instances of people building without an architect because of this belief.

#### The Architectural Association—Annual Dinner.

Pressure on the space available in our last issue prevented us from more than noting the holding of the annual dinner of the Association, a social function which was revived after a lapse of several years. "All work and no play," they say, "makes Jack a dull boy." Well, if that be true of individuals—and who can doubt it?—it is still more applicable to societies. Occasional gatherings for social intercourse do much to cement professional friendships, to hold societies together, and, above all, by making the members personally known to each other, to minimise and even entirely destroy that tendency to trade jealousy and mutual distrust, that, alas! the stress and competition of modern life has such a tendency to engender. Happily nowhere is there less of that jealousy than in the Irish Association, where the best of good-fellowship prevails amongst the brotherhood of the T-square. The dinner the other night was an unqualified success, and several guests declared it to have been one of the pleasantest functions they had ever attended—friendliness and an absence of formality prevailed. Wisely—very wisely, we think—the committee in charge decided not to emulate the great formal banquets proper enough to old and rich corporations like the College of Surgeons, or representative bodies such as the Master Builders. The guests, with the exception of a very few representatives of other bodies having cognate aims, such as the Institute of Architects, were limited to the personal friends of the members. The president, Mr. Allberry, proved an ideal chairman, making no

long speeches; he said just the right thing in the right place, and the various speakers followed his example. Toasts were few and the music good. The president spoke of the aims and objects of the Association, and was able to point to a record of the continued progress in the cause of education; he emphasised that the A.A.I., mainly a students' body, claimed no representative professional status, but limited its efforts to the advancement of education, and the provision of a common ground upon which seniors and juniors could meet and further their mutual or respective interests in all matters apart from affairs of purely professional "high politics." Mr. Allberry reminded all that the Association numbered many members of the Institute, and that they were loyal to the senior body, in all things anxious that anything they might say or do in the Association should never clash with or usurp the functions of the older body. The great question of a standard curriculum is still indefinitely propounded; neither the law of the land nor universal custom compels a man to subscribe to the curriculum of the British Institute, nor yet lay down any alternative thereto; but the time has come when every thoughtful man admits that human nature being what it is, "Boys will be boys" to the end of all time, and that the boys of to-day, no more than their predecessors of yesterday, will never as a class work hard and systematically, so long as neither the laws nor the immovable public opinion of their fellows compel them to amass a given minimum degree of knowledge. When once established in busy practice or as hard-worked "ghosts," they learn too late, when they no longer possess the necessary leisure, and are compelled by stress of circumstances to devote all their energies to the design and supervision of purely utilitarian work, that it *would* have been a good thing and a fine thing to have worked hard to pass a qualifying examination in their student days. With the majority of men, after the first five years, the opportunity is gone for ever. The Architectural Association has come to recognise that a definite objective is essential to either systematise or popularise architectural education.

### The Architect in Fiction.

We wonder how many of our readers have been struck with the occasional pen pictures of a builder or an architect to be met with in the popular novel of the day. Though generally silly, one occasionally meets with a truer description. One of Thomas Hardy's novels opens with a scene in which a young architect is engaged sketching an old church doorway. But then Thomas Hardy was himself an architect. Lately we met with a remarkably fine piece of descriptive writing of that kind in a recently published novel, "The Sands of Pleasure," the hero of which is a young engineer engaged in the building of a lighthouse on the wild Cornish coast.

The author is not alone a fine writer, but plainly possessed of no mean degree of technical knowledge; for the process of building is described with a degree of minute detail that is almost professional. Possibly some day we may give an extract from the novel.

One of the best descriptions of the life of an engineer on the pioneer railway work of South America is to be found in Colonel Richard Henry Savage's "Soldiers of Fortune."

In Miss Braddon's latest work, "Dead Love has Chains," the veteran novelist gives us a glimpse of the fashionable "arty-crafty" architect of to-day, which has a delightful little touch of sarcasm about it that is all the more keen in that it is truthful of a certain class.

The blue-blooded hero and heroine have been house-hunting, and have at last found what they want—a little Early Victorian house of that type so common in Mayfair and Belgravia, spacious as a band-box, stucco-fronted, and outrageously exorbitant in rent. Miss Braddon tells us:

"that after days of exploration a small house was discovered in Park-lane, which was the situation Irene had desired from the first. And then came hours and hours of consultation with the fashionable and æsthetic architect who was to alter, renovate, restore, and bedeck the house, until nothing but the mere shell of the original building would remain—that which was kitchen becom-

ing wine cellar, and servants' bedrooms being transformed into kitchens, all inner walls on the first and second floors being removed, leaving vast spaces where there had been small rooms, a fabric sustained by steel girders and a pilaster or two."

The "fabric sustained by steel girders and a pilaster or two" is simply too good not to share with our readers. Then again she tells us of the

"original telescopic drawing rooms, the positive, comparative, and superlative, expanding from a boudoir not much bigger than a powder closet at the back of the house, through a smallish middle room, to a somewhat spacious drawing room with three French windows opening on a balcony."

Which certainly sounds—whatever it may have been in reality—vastly more comfortable and appropriate to the West End than the projected transmogrification in which

"the early Victorian balcony was to disappear, and the three windows were to become one, stone-mullioned, mediæval, with a deep window seat, and leaded casements to let in the rain."

The leaded casements "to let in the rain" has a ring of truth about it that is good, and if fact is often stranger than fiction, possibly fiction is occasionally truer than fact!

### Bachelor Flats.

Sometime since reviewing that excellent work of Sydney Perks', "Residential Flats," published by Mr. Batsford, we remarked that flats had never proved popular in Dublin—possibly some critic of our criticism might answer, "Because they had never been tried." Still, if the demand existed, the supply would probably follow. Nevertheless there is a class of flat that we believe *would* prove a financial success in Dublin, for we think it would, like somebody's popular patent pills, "supply a long-felt want." The class of residential flats we allude to are bachelor flats, not the palatial suites of the West End of London, let at rents that a young Irish professional man would consider a fair income to marry and bring up a family on, nor yet artisans' dwellings, but something between the two that would afford the young business or professional man an alternative to the cold, dreary comfortlessness of "furnished lodgings," or "board and residence with all the comforts of home," that daily figure of speech abounding so plentifully in the pages of the "Irish Times" or the "Freeman," but, alas, too well known to the weary and depressed migratory lodger in Dublin. We think that if someone of good business capacity and of a speculative turn of mind would build such flats as we indicate there can be little doubt that he would get a fair return on his capital invested. Dublin is not a "clubbable" city in the sense that London is, where probably the majority of unmarried men belong to a club of some sort or other, run on lines suited to their station in life and their pocket. In Dublin fewer such facilities exist, and but a very small minority of Dublin bachelors belong to a social club, and even to those who do, the cost of residing in, or even having all meals in a club, is prohibitive to men of small means. In Dublin are resident practically all the year round immense numbers of bachelors, whose homes are in the provinces, and who fluctuate between private hotels, boarding houses, and furnished lodgings. They range in social status from young professional men—barristers, solicitors, engineers and so forth, bank and commercial clerks, and shop assistants. We believe that it would be a remunerative enterprise to erect a house, divided into flats of sizes suited to the wants and means of the occupants, the probability being that nine out of ten men would desire two rooms of quite modest size, though others might demand three rooms, and some again might content themselves with one large room, or a room with a bed-alcove. The rooms on the ground and first floor might be of a more luxurious type, say suites of three rooms, and possibly each with its own bathroom, etc., to meet the wants of those willing to pay therefor. Those of leaner purse might find accommodation suited to their requirements upon the upper stories. Three or four common rooms would be essential, a dining-room, combined smoke and card-room, with possibly a small visitors' room on each floor might be neces-



sary. Such luxuries as billiard-rooms, elaborate writing or reading-rooms, would not be essential, because there is no lack of accommodation of that kind outside; but that is a detail. The probability is that the tenants would prefer to entertain their friends and possibly to eat their meals each in his own apartment. The servants' and culinary department, while ample and sufficient for the purpose in view, should be so arranged to keep the cost of service at the lowest possible charge, so as to admit of the flats being let at so moderate a rent as to prove popular and at the same time yield a fair return on the investment. To enable this to be done, everything in the planning and construction should be rigidly plain and good, though not necessarily bare or unsightly. Probably the most favourable location for such a building would be a central one, and possibly it would not be beyond the ingenuity of some architect to so plan the structure as to utilise in whole or in part the main fabric of three or four of the large houses in some of our respectable residential streets on the South side, such as occasionally come into the market on terms favourable to a purchaser.

We throw out this suggestion of "Bachelor Flats" for what it is worth; perhaps some speculative builder may think it worth his while to turn it over in his mind when the present epidemic of speculative building in the suburbs has spent itself, and he wants another outlet for his energies and his capital.

#### Baths for Agricultural Labourers.

Several times lately we have thought of writing on the subject of the provision of facilities for bathing for labouring men in cases where the sites have been marked out for any considerable numbers of new cottages close together and intended for the occupation of rural labourers. The District Councils have tried to make the cottages erected during the past twenty years as comfortable and as substantial as is possible, but there is usually not a single bath provided. It occurs to us that in cases of a large number of cottages close together it would be a simple matter to provide a cheap common bath and wash-house where the women could wash the domestic linen in comfort. Under the crowded conditions prevailing, even in four-roomed cottages, it is most difficult for a labouring man coming home from his work at night to get a bath. In the summer time particularly a cold bath would, we feel certain, be a most welcome adjunct, and the medical officers often declare how necessary to health it is. These poor people at present are absolutely without any such facilities. The erection of cottages close together affords a chance of approaching the subject wherever there is a water supply from a stream near at hand. A small concrete chamber, available for men and women at different hours, and capable of being at other times used as a wash-house, could be put up in a corner of the site for little or nothing. We would provide no hot water, no towels or luxuries of any kind, but simply a concrete bath in which during the summer months half a dozen labouring men could bathe in comfort. We think such provision is a duty incumbent upon any building owner erecting many cottages together. In England it is becoming quite common to provide such dwellings with separate baths, but we suppose so much cannot be expected in this country at present, but the alternative suggested might afford a way of meeting the undoubted want.

#### Technical Education in Belfast.

The principal of the Municipal Technical Institute in Belfast sends us a copy of a very interesting publication entitled "The Students' Guide to Prizes and Scholarships." It is a particularly clear handbook of the facilities available for obtaining a technical education in the higher sense, and sets forth the educational opportunities afforded the various institutions in Ireland, as well as particulars of the prizes and scholarships which may be gained in this country. Such a handbook must prove of great value to students, who are often puzzled to know how and where to begin. It also gives him an idea of

the exact amount of time and money he may have to expend to attain a definite object. As our readers are doubtless aware, Belfast is fortunate in possessing a particularly well equipped technical school, housed in the splendid new institute in College-square.

The curriculum includes a day and an evening division, sub-divided into classes covering a wide range of study. The school is fortunate in being in a position to offer a number of very substantial local exhibitions and prizes, amongst which may be mentioned the "Sir Otto Jaffe" Exhibition of the substantial value of £50, given for the purpose of encouraging the scientific and technical study of either mechanical or electrical engineering, or naval architecture.

Messrs. McLaughlin and Harvey, contractors offer a similar exhibition of £50, but for encouraging the study of building and sanitary engineering subjects. We are glad to see it noted that the subjects to which most weight will be attached are mathematics and the various building trades subjects.

In addition, there are a large number of "special local prizes" for proficiency in a variety of really practical subjects, amongst which may be mentioned practical mathematics, geometry, practical, plane, and solid, machine drawing, applied mechanics, building construction, carpentry and joinery, cabinet-making, painters and decorators' work, plumbing, chemistry. In design, prizes are offered for poster design, pottery and tiles, constructional ironwork, mural decorating (a scheme for the decoration of the central hall of the Institute being set as a practical problem), furniture design, measured work, enamelling on metal, and repousse work, and amongst the donors may be mentioned Messrs. Musgrave and Co. and Messrs. H. and J. Martin, builders.

These facts appear to us to indicate that a very healthy and practical state of public opinion respecting the value of technical education has been brought about in Belfast.

#### OUR ILLUSTRATIONS.

##### The Bournville Village.

We illustrate a few examples of the excellent work accomplished by the Bournville Trust, as is more particularly set forth in our article thereon in this issue.

#### FOREIGN CEMENT A FURTHER WARNING.

In our note of October 14 last we referred to the fraudulent devices adopted by certain Belgian cement makers in marking their products so as to lead purchasers to believe that they are buying the British-made Portland cement, a reprehensible practice which is encouraged by the action of the Custom Authorities in permitting the importation of foreign cement without the warning obviously intended by the Merchandise Marks Act. A good deal of the foreign material so placed upon the British market is not Portland cement at all, but "natural cement," which is admittedly of very inferior quality, and, owing to its low price, has found extensive sale in the United Kingdom. Of course, in some cases it may happen that the rock employed in the production of natural cement may be more or less correct as to chemical composition, but there is no guarantee that this will be the case, as the process of manufacture does not include methods of scientific control, or any attempt to regulate the proportions of the ingredients. It may be asked, if the material in question is of such inferior quality, why those concerned in its sale are able to publish satisfactory results as to its tensile strength. From a pamphlet issued by the Associated Portland Cement Manufacturers it appears that the answer is very simple, namely, that samples of cement are prepared for advertisement purposes from specially selected rock, but that these do not truly represent the bulk of the cement afterwards delivered, nor do they afford any criterion of its quality. Considering the endeavours that are being made by British architects, engineers, and manufacturers to improve the quality of Portland cement, it is much to be regretted that the nefarious methods of business to which we refer should be countenanced at all in this country, and especially by those upon whom devolves the duty of seeing that the provisions of the Merchandise Marks Act are properly carried out.—*The Builder*.

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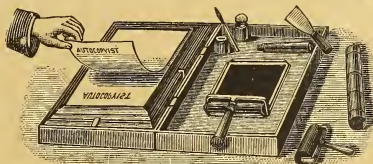
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**Athlone.**—The Board of Guardians of the above Union received tenders for carrying out improvements in the Fever Hospital, according to plans and specification of P. J. Prendergast, Esq., C.E.

The new schools at Our Lady's Bower are now in course of erection. The walls are now six feet above the surface, and it is calculated that the schools will be ready for occupation by the end of May. The new building is being erected according to the most modern ideas of school architecture. In general design the style is Elizabethan. The building is erected on a foundation of concrete. The walls are of Tullamore brick, ornamentally picked out in cement stucco, and the slated roof is of the Kingport style. The ventilation and heating arrangements are of the latest and most approved designs. The building is T-shaped in design, and consists of an entrance hall and large classroom. On each side of the hall are parlours, music rooms, etc. The schoolroom proper is 62 feet clear in length by 20 feet broad, and the space can be divided into three or more classrooms by sliding partitions. The erection of the building will cost at least £1,000, and it will be a fine addition to the magnificent pile of buildings which forms Our Lady's Bower. The Sisters purpose making further improvements in their educational establishment. The National Schools in their charge are barely able to accommodate the pupils attending them, and a recreation ground is badly needed. It is intended to erect an extension to the schools and to provide a commodious playground. Mr. Prendergast, C.E., is the architect.

**Armagh.**—The Secretary of the County Council will receive tenders on Tuesday, 13th March, for the execution of the following works:—1. Painting the outside of the County Court-house. 2. Painting corridors, Jury Room, etc., Lurgan Court-house.

**Belfast.**—A new factory on the Donegall-road, Belfast, is being erected for Messrs. Wm. Adams and Co., by Messrs. J. and R. Thompson, at a price of £600. The same firm have secured a contract for additions to the Monarch Laundry on the Donegall-road, Belfast, the amount of the contract being about £1,500. The construction will be erected in an entirely new system of building construction, the walls being formed of cement blocks, finished to represent stone work, and the pillars, beams and columns will be done in "Ferro concrete" (Hennebique's system of construction).

In the new building for the Scottish Temperance Insurance Co. all the marble, mosaic, and Terrazzo marble floors were laid by Mr. J. F. Ebner, London, for whom Mr. W. J. Shaw is local agent, who also laid the Terrazzo marble floors in the new premises of Messrs. Thompson and Sons, Donegall-place.

**Ballina.**—Messrs. W. H. Byrne and Son, of Dublin, are the architects for the new Diocesan College, Ballina, which is now almost completed. The contractors are Messrs. McKee and M'Nally, Dungannon.

**Ballymena.**—The memorial to the late James Cosbie, Esq., J.P., recently erected in St. Patrick's Church, and which was unveiled by the Right Rev. Thomas Welland, D.D., Lord Bishop of Down, Connor, and Dromore, takes the form of a two-light stained glass window with circular tracery work in the south aisle. The subjects are "The Parable of the Sower" and "The Good Samaritan," enclosed within a light shafting and border, the bases and canopies being of a Gothic character, thus harmonising with the surrounding architecture. At the bottom is the dedicatory inscription, "To the Glory of God and in Loving Memory of James Cosbie, J.P., who died on the 18th May, 1905." A three-light window has also been erected by Miss Knowles in the south transept—the subject chosen being "The Ascension"—in memory of John and James Ballentine and their sisters. The windows have been treated in a way that keeps them subservient to the architecture, and the fact that the work is all of Irish production should be a source of gratification to the donors, who should be congratulated on having shown conclusively that it is not necessary to go outside Ireland for high-class stained glass work, as seems to be the prevalent idea of many. The windows were designed and executed in the studios of Messrs. Campbell Bros., Franklin-street, Belfast, and are another successful addition to the many commissions of a similar character entrusted to this firm. Messrs. Campbell Bros. are at present engaged on stained glass work for the new City Hall, Belfast.

**Bangor.**—Messrs. J. and R. Thompson have secured a contract for the building of a dwellinghouse for Mr. R. J. Woods, of Bangor. The architect is Mr. E. L. Woods, Town Surveyor, Bangor, and the amount of the contract about £1,500.

**Boyle.**—At a meeting of the District Council it was decided to petition the Department of Agriculture and Technical Instruction to secure for the purpose of a technical school the premises in the township of Boyle known as Tarmen House, with the twelve statute acres of land surrounding it, at present in the possession of the Estates Commissioners.

**Castletomer.**—Mr. R. H. Prior Wandesford, J.P., D.L., asks us to give a denial to the rumour that he is about to erect a Town Hall in Castletomer. He has no present intention of doing anything of the sort.

**Dundalk.**—The Dundalk Brewery have received tenders for erecting new malt house from the designs of Messrs. Batchelor and Hicks.

**Golden (Co. Tipperary).**—The Guardians are about to acquire land for the purpose of building a doctor's residence in the neighbourhood of Thomastown, on the main road, not more than a mile at either side of Thomastown Dispensary.

**Cork.**—RURAL DISTRICT COUNCIL.—This Council received tenders for execution of the following works:—Erecting wall to enclose waterworks at Ballyfoulou, Monkstown; repairing roof of caretaker's residence at Caherlag Burial Ground.

**Kinsale.**—The Council of the Kinsale Rural District received tenders for completing the unfinished work of three labourers' cottages, which are situate in the townland of Horsehillbeg, Horsehillmore North, and Shanavally respectively.

The Council of the Kinsale Rural District received tenders for the erection of public water closets and urinals in the village of Crosslaven, according to the plan and specifications prepared by Richard Evans, Esq., C.E., 53 South Mall, Cork.

**Kingstown.**—The Kingstown Urban Council will, at its meeting to be held on next Monday, select a quantity surveyor to carry out the work in connection with the erection of buildings which are part of the scheme for the destruction of the town refuse. These buildings will be erected at a cost of about £2,000. Further particulars, if necessary, can be had from the Town Surveyor, Town Hall, Kingstown. Applications, which should include references and testimonials of a late date, should reach the town clerk not later than 12th inst. Terms must be stated.

**Letterkenny.**—Tenders are invited for building Teacher's Residence at Letterkenny, for the Select Vestry of Cornwall Parish Church. John M'Intyre, Architect, Letterkenny.

**Mullingar.**—The Rural District Council received tenders for the supply of 48 iron gates.

**Newry.**—The Local Government Board have appointed Mr. W. E. Holmes, of 18 Nassau-street, Dublin, as arbitrator to determine the price of sites proposed to be acquired by the Newry No. 2 (Armagh) Rural District Council, for the erection of labourers' cottages.

**Poulfur.**—POULFUR CHURCH.—Steps are being taken by the Very Rev. Canon Synnott, the Rev. M. Kinsella, and the people of Poulfur, in the parish of Hook, to have the old T-shaped church at Poulfur replaced by a suitable modern building. A site has been secured. Mr. Michael Power, architect and builder, Tintern, who designed and erected the new parish church at Templeton, has drawn a plan for the Poulfur Church which has met with the approbation of the pastor.

**Strabane.**—Tenders are invited for renovation of Grange National School. Plans and specification to be had from Rev. J. Connell, B.A., Donaghedy, Strabane, to whom tenders are to be sent not later than March 31st, 1906.

PROPOSED TECHNICAL INSTITUTE FOR STRABANE.—A meeting of the Strabane Technical Committee was held, and it has been decided to accept the offer of the Urban Council as to the granting of a site, and Mr. Stewart, borough surveyor, was directed to draw up the plans. A committee has been appointed to assist him.

**St. Johnston.**—A new Masonic Hall has been erected in St. Johnston. The architect was Mr. M. A. Robinson, M.Inst.C.E., and the builder, Mr. R. J. Fleming. The hall of the front elevation is built upon a site which the Duke of Abercorn has given at a merely nominal rent, and has been erected at a cost approximating to £600. Externally it is a handsome structure, and internally it is well lighted, well arranged, and commodious. It affords a spacious lodge-room and ante-rooms of sufficient size.

**Tullamore.**—Tenders are invited for the building of a laundry in Tullamore. Particulars of plans and specification can be had on application to Messrs. Hoey and Denning, Solicitors, Tullamore.

# ENGINEERING SECTION.

## ITEMS.

According to rumour, the Pirrie-Iveagh motor scheme is not quite defunct, in spite of the *laissez faire* attitude of the Irish County Councils. It is understood that arrangements are being made for a new survey of many of the central and southern districts of Ireland, with a view to the development of light railways and motor services purely for agricultural transport purposes. The particulars and correspondence connected with the earlier proposals will be carefully considered before the question is definitely raised in the House of Commons, but we believe that the responsible authorities have already agreed on the main line of action.

The new Vauxhall bridge over the River Thames is now nearing completion, for which the inhabitants of South London will surely feel devoutly thankful. When first the old bridge was condemned as unsafe, owing to the undermining of the foundations, it was decided to build the new structure of granite, and it will be remembered that a very wordy warfare ensued over the merits of the design. After this useless expenditure of breath and of ink and paper, borings were made and insuperable difficulties were revealed, owing to the plastic nature of the subsoil. An elliptical steel arched structure was then substituted. One of the most interesting features of the demolition of the old bridge and the erection of the new one, has been the use of the Blondin cable, with a carrying capacity of seven tons. About 130,000 tons of material were conveyed from point to point by this means.

There are many County Surveyors and other public officials who are of opinion that the more convex the surface of a road, the better is its design from all points of view, use, condition, and economy of maintenance. Such a theory is found to be entirely erroneous when put into practice, for an exaggerated curve is dangerous to all but slow moving vehicles. Drivers, therefore, all keep to the crown of the road, which receives far more than its proportionate amount of wear and tear. A moderate inclination from the centre to the sides is the best for throwing off water, and there is no danger of a road with little convexity wearing hollow in the centre if it receives fair attention. A good rule to remember is that the versed sine of the section should be one-sixtieth of the width between the kerbs, and Codrington in his book on the "Maintenance of Macadamised Roads" held identical views, for he states that the fall from the centre to the sides of a road should not, as a rule, be more than six inches, and never more than 9 inches, and that for a road 18 to 20 feet wide 3 inches or 4 inches is sufficient.

A new set of circumstances will arise in connection with the bridging of the River Lee, and the linking of the West Cork railways with the main lines, if the energetic Waterford people have their way. It will be remembered that a sum of £93,000 is at the disposal of the Treasury for railway development in the South of Ireland, and this was earmarked for the special purpose of assisting in the construction of a direct line of railway from Fermoy to Dunkettle, the bridging of the River Lee, and the junction of the railway systems north and south of the river. Last year the Waterford County Council obtained the allocation of £33,000, over a third of the total, for the construction of a free bridge over the River Suir, and as this has little to do with railway development, it may rightly be considered as a curious application of the fund. A determined effort is now being made to secure the remaining £60,000, as a subsidy to those who are disposed to promote the Capagh and Youghall link railway scheme, which is only a portion of the larger scheme known as the Cork and Waterford railways, under which the Lee was to be bridged by the overhead arrangement, already generally condemned. It will therefore be seen that if this balance is to be entirely devoted to the Waterford section of the scheme, there will be none of the earmarked funds available for the Cork Junction scheme, and as this latter will scarcely be a successful financial undertaking, although of the greatest public benefit, it will probably have to be abandoned unless extraneous aid be forthcoming. It is therefore to be hoped that local influence will be brought to bear on the Treasury, either to ensure that the balance may be evenly spread over the whole development project, or that a further grant will be forthcoming when the Cork portion of the work is about to be undertaken.

A very practical paper was recently read by Mr. J. Mitchell Moncrieff, M.Inst. C.E., before the North-East Coast Institute of Engineers and Shipbuilders, his description of the main points to be considered in the construction of dry docks being of great utility. In Ireland this question is one which, except occasionally in the north, does not often come within the scope of engineering practice, although a deputation waited last month on the First Lord of the Admiralty for the purpose of impressing upon him the necessity of extending the existing graving dock at Queenstown for naval purposes. The most locally interesting portion of Mr. Moncrieff's paper is that dealing with materials, particularly in reference to concrete, and with his remarks on this subject we are in cordial agreement. The author stated that the cheapness of concrete, its execution by unskilled labour, the facilities it affords for carrying on work in a loose manner, and the presumed monolithic result obtained by the disposition of one batch on another, instead of being virtues are really vices, especially when work is exposed to the action of salt water. In such cases it becomes absolutely essential to carry out the work in such a manner as to totally exclude the water from the interior of the concrete, for if percolation be once established subsequent disintegration must invariably ensue. It is of the highest importance that all beds should be quite level and flat, and the connections of the beds formed by layers of cement mortar. Otherwise, percolation along the seams will occur. The author of the paper apparently looks on concrete as an artificial stone, which should be used according to masonry methods, in blocks; the monolithic value of the material he considers to be of minor importance, or rather, we should say, as a defect.

In our last issue we published the text of a report by Mr. J. H. Ryan, M.A., M.Inst. C.E., on the works necessary for the improvement of the port of Drogheda. The scheme suggested included the raising and extension of the North and South Walls, the erection of two lighthouses, and the deepening and alteration of the existing channel as far as may be necessary. The cost of these works is estimated at about £130,000, and having regard to the status of the engineer who drew up the report, it may safely be considered that this sum represents what should actually be expended if the improvements are to be boldly and successfully grappled with. It is not so many years ago since Drogheda was a centre of industry with a flourishing shipping connection, and a large export trade more particularly in connection with Liverpool. But recently its position as a port has gradually dwindled, and it is fast losing its claim to be the most important shipping centre between Dublin and Belfast. In this respect it is, of course, only sharing the fate common to so many other commercial towns in this country, but such generalisation is scarcely sufficient explanation of its decadence. The vital necessities to every port in these days are ease of access and deep water. In both these the River Boyne is deficient. Its navigation is always a matter of extreme difficulty, and as Mr. Ryan indicates in his report, the bar at the mouth of the river is highly dangerous, there being but a depth of some 13½ feet of water at neap tides. At first sight the sum required to carry out the scheme seems very considerable, but we have always held that a large initial expenditure is more justifiable, and promises far better results, than a succession of small grants and loans under which engineering work can be executed only with extreme difficulty. Moreover, it often happens that part way through the scheme there comes a change of officials or of public opinion, energies flag, work ceases, and another monument of failure is added to the many which disfigure this island. The Drogheda Harbour Board does not possess the funds necessary to embark upon the scheme, and it is highly probable that it is not in a position to raise the money by way of a loan. At a recent meeting it was therefore decided to approach the Chief Secretary on the matter, and it will be interesting to note how this appeal for State aid will be regarded. There is no question that a strong case can be made for such assistance, and it is not so long ago since the late Chief Secretary obtained a Treasury grant of over £20,000 for the improvement of the Wicklow Harbour. This, however, cuts both ways, and the Government may rightly think that for the present sufficient funds have been allocated to the East coast. It may in any event be confidently expected that Mr. Bryce will carefully weigh the pros and cons of the application, and his knowledge of the present wave of industrial revival, which is being experienced in even the remotest portions of the country, may help him to a favourable decision.



Following closely on the Royal opening of the Aldwych and Kingsway in London, the new artery between Holborn and the Strand, the shallow tube tramway which has been laid beneath these thoroughfares was officially opened on Saturday last. The ceremony was not made the occasion of a public function, and was performed by the Chairman of the London County Council. The system is the first of its kind in London, and is designed on that which is in successful use in Boston and other American cities. It consists of twin tunnels, except for a short distance at the Holborn end, where they converge into a single square box tunnel, the top of which is within three feet of the surface of the roadway. The total length of the subway is about three quarters of a mile, the width being 20 feet and the height 13 feet 6 inches, and the estimated total cost is £279,000, of which about one quarter was expended in the acquisition of land and easements. A modern and satisfactory feature of the scheme is the construction of smaller subways 12 feet and 7 feet 6 inches wide for the conveyance of pipes and mains, so that the breaking up of the thoroughfare for their repairs will never be necessary. The cars are single deck and are constructed of steel and non-inflammable timber.

At the recent annual dinner of the Architectural Association of Ireland, Mr. Purser, the Hon. Secretary of the Engineering and Scientific Association, made passing reference to a scheme for housing the junior professional and technical societies in Dublin, or, as he happily put it, "the housing of the very poor." We believe that the suggestion has already been slightly and informally discussed by the Presidents of the two associations, and it is now a question whether a further step should not be taken to ascertain how best such a project could be developed. Both the Associations are working on identical lines for the education and general benefit of the junior members of the respective professions, and to carry out the intentions successfully a large annual expenditure is necessary. It seems a pity that so much of the societies' income should be devoted to the payment of rent, and if a combination could be formed of a few junior bodies some suitable premises could be obtained in a convenient locality which would be common to all, and a vast economy be thereby effected. While each society would be self-controlled with its own committee and private rooms, the reading-room, library and lecture hall would be available for joint use, and the members of the various professions would thus get into touch with each other, which would prove of the greatest utility in after life. The scheme seems capable of development in a highly satisfactory manner, and we hope to hear more of it in the near future.

A deputation of the Greenock Corporation has recently inspected the refuse destructors at Glasgow, Ayr, Fulham, Hackney, Liverpool, Mansfield, Nottingham, and Partick, and has prepared an elaborate and most useful report on the result of their investigations, which contains much valuable information on the most modern methods of refuse disposal. It appears that although the connection of the destructor plant, with the generation of electricity is of recent development, enormous strides have, within latter years, been made in this direction, and there are now in operation seventy-four municipally owned destructor installations working in combination with electric supply stations, most of which have been installed within the present century. The most striking feature of the report, and one which will commend itself to the public at large, is that it is a certainty that a modern destructor installation working with a 2,000 degrees Fahr. furnace temperature and producing power to the extent of forty to fifty units per ton of refuse consumed, is, in every degree far ahead of an ordinary coal-fired boiler plant. In the twelve installations inspected the whole of the destructors visited, with the exception of Glasgow, are combined with electric power stations for lighting or traction purposes. The best results in the various designs were found to be obtained where the steam production is under the control of the department which uses it.

The deputation makes no invidious distinction as to the best type to be adopted, but confidently recommends the top feed principle as an essential. We give the financial aspect of the question in detail, as this is always of the first importance. A complete installation from a high class firm should be obtained for, at the most, £16,000, which, if borrowed at 3½ per cent. interest and repayable in twenty-five years under the annuity system, would debit the cleansing department for destroying, say, 16,500 tons of refuse with an annual charge of £920, or about 1s. 1d. per ton. Assuming, further, that wages and repairs amounted to 1s. 6d. per ton, and that forty units of electricity were

produced per ton of refuse destroyed, the result would be that the electricity department would be able to generate 660,000 units of electricity at a cost of £2,131, or .77d. per unit, until the loan be paid off, after which the cost will be reduced by over fifty per cent.

## LAW.

### Belfast Ancient Lights Case.

On Saturday in the Chancery Division, Mr. Justice Barton delivered judgment in favour of the plaintiff in an action heard during last sittings, in which Mr. George Black, a manufacturer of ready-made clothing in Belfast, sought an injunction against the Scottish Temperance Assurance Company, restraining them from continuing the existence of a nuisance or legal obstruction to the plaintiff's ancient light in his factory and warehouse in James's-street, South, Belfast. The defendants had erected a handsome and lofty pile of buildings at the corner of Bedford-street and Donegall-square, immediately behind the new City Hall, at a cost of £64,000. These premises when completed overshadowed to some extent the plaintiff's smaller premises, situated adjacent thereto, and it was proved in evidence that there was thus a considerable obstruction of light caused not only on the ground floor, but on the two upper floors, where various operations in connection with the plaintiff's business were carried on, requiring a good supply of light.

Mr. Justice Barton said that on the whole case he was bound to come to the conclusion that the defendants' building, as regarded the obstruction to light which it caused, was an actionable nuisance. It was possible that the nuisance might still be capable of reduction or of being obviated in some degree by facing the particular walls complained of with white brick. While saying that that was possible, he must not be taken as expressing any opinion upon the subject. He would not make any decree in the form of a mandatory injunction to compel the defendants to pull down the building, although that was the form in which he would make it, if he was satisfied that it could not be obviated, but he was not so satisfied. The decree he would make would be a limited decree, with liberty to both parties to apply. The defendants would be restrained from maintaining the building in such a condition as to continue the nuisance. He would make no order at present with regard to allowing costs on the higher scale, and also the expenses of expert witnesses, but he was inclined to think that there would be no necessity to depart from the ordinary course as to costs.

Messrs. Bates, K.C.; McGrath, K.C., and Pigot (instructed by Messrs. H. and W. Mahaffy) appeared for the plaintiff; and Messrs. Matheson, K.C.; Gordon, K.C., M.P., and W. M. Whitaker (instructed by Messrs. Johnstone and Walkington) for the defendants.

### SOME INSTRUCTIVE FIRE TESTS.

We have been favoured with one of the "Red Books" issued by the British Fire Prevention Committee, and dealing with one of their fire tests carried out with the Kinneair steel rolling shutter. At the outset we may remark for the information of our readers that the purpose of these fire tests is, amongst other things, to obtain reliable data as to the exact fire resistance of the various materials and systems of construction used in building practice. The tests are of an entirely independent character, arranged on scientific lines, and absolute reliance may be placed on the results established by them. With regard to the test dealt with in the book before us, the object was to record the effect of a fire of 90 minutes' duration at a temperature gradually increasing to 1,800 F., followed by the application of water for two minutes on the fire side. The shutter tested covered an opening which was approximately 9 feet wide by 8 feet high, and the temperature to which it was subjected may be gauged from the fact, that in 20 minutes after the beginning of the test the heat on the outside was sufficient to ignite a newspaper placed 12 ins. from the face. In 47 minutes the flame came over the top of the shutter, and continued to the end of the test, the whole shutter becoming red hot, and the upper part bulged outwards about 6 inches. At the end of the test the shutter remained in position, and at no time did flame pass through it or around the sides. Following this test, a second series of two experiments were carried out with the Kinneair shutters a couple of weeks ago. One was with double shutters for a 4 hours' test, and one with a single shutter for a 2½ hours' test, followed by the application of water. Both withstood the ordeal to which they were subjected, and obtained the highest classification, namely, that known as "fully protective." We have already dealt fully with the Kinneair shutters, the agents for which are Messrs. Arthur T. Gibson and Co., of London. These shutters possess many great advantages to which may now be added their absolutely fire-proof quality.

## EXPANDED METAL.

## Steel Concrete and Plaster Construction.

As we have for a considerable time past devoted a great deal of attention to the subject of re-inforced concrete, a large proportion of our readers may be fairly assumed to be familiar with its main principles. In explaining these we have for various reasons derived our illustrations and explanations from one or other of the Continental systems, and it now becomes our pleasing duty to give some account of the best known and most highly approved of the British methods of armoured concrete construction. The system to which we refer is that known as "Expanded Metal," the name of which is familiar to every builder of prominence in Ireland, while the material has probably been used for one or other of the many purposes to which it is applicable by the majority of them.

Expanded metal for building construction purposes is made from sheets of rolled metal (mild steel is at present the metal most in demand) of various thicknesses cut and expanded by machinery into meshes of a diamond shape. The expansion effected causes no diminution in weight, and no reduction in the original length of the sheets, but the original width is increased from two to twelve times according to the size of the meshes, and the width of the

work, expanded metal lathing is particularly adapted owing to the simplicity of the methods used and the unequalled fire-resisting qualities of such ceilings. The ceilings may be suspended at any desired level, and with arched floors they may be hung in curved form following the contour of the arches. The weight of such ceilings, including the metal grounds and plaster, ranges from about 9 to 12 lbs. per foot super. Expanded metal suspended ceilings have been used in some of the principal buildings erected in recent years, including the Royal Victoria Hospital and Island Bridge Barracks in this city. For solid partitions expanded metal and plaster or cement have been widely adapted in various countries throughout the world. Compared with a half brick wall they effect a saving of about 66 per cent. of space and more than 50 per cent. of weight. In strength they may be made equal to any practical demands, inasmuch as the combined steel and plaster work forms a monolithic slab, which will withstand any reasonable pressure or thrust. Such partitions are not only fire-proof, but exhibit remarkable sound-proof qualities. Solid partitions of this description have been used in the construction of the Royal Victoria Eye and Ear Hospital and the Central Fire Station, Dublin. Hollow partitions on this principle are also constructed, and both the solid and



Water Softening Tanks at Messrs. Courtauld & Co.'s Works, Bocking.

[Mr. James Clayton, M.I.M.E., Engineer.

strands formed. A most important feature of the process of expanding the metal is that the tensile strength of the steel, where steel is used, is greatly increased by the process of distension. This fact, which may be described as extraordinary, has been amply demonstrated by a number of elaborate tests carried out by some of the leading engineering firms in England. Expanded metal is at present manufactured in sheets of almost any convenient size up to the limit of 16 ft. the long way of the meshes, and in thickness from 24 B.W.G. to  $\frac{1}{4}$  in. plate. It is peculiarly adapted to form a key for retaining plaster for ceiling, partition and other plaster work, and it affords a perfect tension bond for armoured concrete construction.

For plaster work the thinner gauges of expanded metal, known as lathing are used. These range from 24 B.W.G. to 18 B.W.G., according to the distance between the bearers or supports, 24 in. spacings being the maximum recommended. Apart from the superior key it gives and the facility with which it may be bent, cut, and attached, the lathing has the additional advantage of being practically fire, damp, and insect proof. Repeated fire tests, up to a temperature of 2,000 deg. Fahr. have failed to remove the plaster or to damage the metal. For suspended ceiling

hollow methods of partitioning can be used for exterior walls. An example of this form of construction may be seen in one of the Dublin Gas Company's retort houses built in the year 1900. The building is 86 ft. long, 56 ft. wide, and 32 ft. high to the eaves. A steel skeleton framework was first erected, and then the whole was encased with expanded metal lathing and covered in with plaster. The walls were formed of three inches of plaster laid on the lathing, which was tied to horizontal tension rods  $\frac{3}{8}$  in. diameter, stretched from stanchion to stanchion. This system of construction gave, when finished, a structure light (and therefore requiring but slight foundation work) strong, and economical, and in every respect suited to the purpose for which it is required. Very effective exteriors can be obtained in this way by modifying the finishing coat to represent work of different classes. For instance, the whole of the clere-story of the Dover Congregational Church is executed both externally and internally in  $\frac{1}{4}$  in. mesh lathing, and many exhibition buildings including those at Cork, were similarly constructed. The same class of construction has been very largely employed for the erection of bungalows, clubhouses, and cottages.

For heavier constructional work in concrete and fire-



resisting building construction, expanded metal has yielded even more remarkable results than in the lighter form of construction to which we have already directed attention. Used with cement the strength of slabs is enormously increased, it having been found that in the case of a 3 ft. 6 in. span the strength of a flat concrete slab is from 6 to 8 times greater when the metal is incorporated than it is if made without the metal, and in the case of a 6 ft. 6 in. span the strength is increased to 10 and 11 times. The natural result of this is that armoured concrete made with expanded steel has been employed all over the world for a great variety of constructional purposes, of which the following are some:—Foundations, floors, roofing, bridges, reservoirs, etc., etc. Amongst local examples the following may be cited:—

Kingstown Artisans' Dwellings.—Floors about 12 ft. 6 in. span.

The Dwellings in the Bull Alley area.—Floors.

Artisans' Dwellings in Plunkett's Area, Rathmines.—Floors, spans about 9 ft.

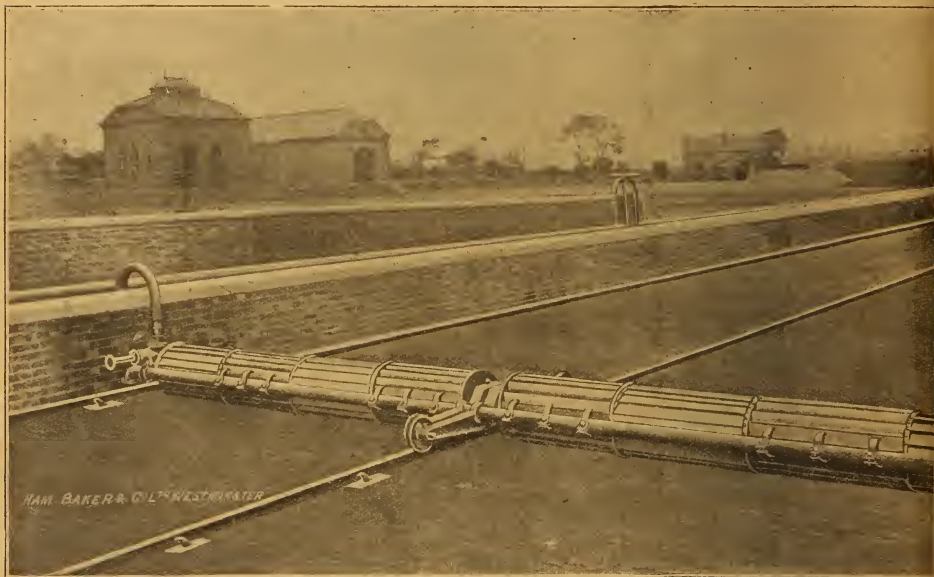
Todd, Burns, and Co.'s new premises in Mary street, one of the finest examples of steel framed, fire-resisting struc-

#### AUTOMATIC TRAVELLING SEWAGE DISTRIBUTOR.

One of our contributors recently inspected one of the latest distributors on the market for spreading the sewage over rectangular filter beds. This apparatus (which is made by Messrs. Ham, Baker & Co., Ltd., Westminster), is at work at the Wednesbury Corporation Sewage Works, a town having a population of 26 554.

The apparatus is entirely automatic in its action, and distributes the sewage most evenly over the filter bed. It sucks the sewage from a trough at the side, as shown in the accompanying illustration, from whence it is delivered through the pipes shown, on to the drums of a wheel, which is formed very much in the same style as an ordinary water-wheel. The weight of the sewage revolves the drums, at the same time driving the apparatus along the bed. As soon as the machine reaches the end of its travel it automatically reverses. This reversing action is carried out by a most ingenious and simple arrangement. The machine then travels back over its bed until it gets to the opposite end, when again it reverses, and so on continuously as long as there is sewage in the trough to feed it.

We are pleased to hear that the reports from Professor Bostock Hill have been so satisfactory that the Wednesbury



Automatic Travelling Sewage Distributor.

tures in Ireland. The floors throughout, and the roof are of expanded steel and concrete, most of the spans being 15 ft. from centre to centre of bearing. The steps are all of similar concrete with a tension bond of expanded steel, while the whole of the structural steel work is protected with an encasing of concrete and expanded steel lathing and asbestos plaster. Amongst other uses to which expanded steel is put is the construction of water conduits, sewers, and other culverts. These have been employed in sewerage works in Leeds, Glasgow, and elsewhere.

Owing to the enormous variety of uses to which this method of construction is adapted, we have been able through want of space to do little more than mention some of the principal classes of work. The subject is, however, exhaustively dealt with in a handbook entitled, "Expanded Metal," which is published by the New Expanded Metal Co., Ltd., York Mansions, York street, Westminster, London, S.W. This pamphlet, which is copiously illustrated, ought to be in the hands of everyone interested in the building trade who wishes to be up-to-date in the latest methods of building construction.

In the construction of the Baker-street and Waterloo Railway large quantities of Mason's patent treads have been supplied. These treads are also being used in connection with other tube railways in London now in course of construction.

Corporation are now carrying out additional works, in which two more of these distributors are to be fixed.

The price of the apparatus is such that it will compare favourably with any other distributor on the market, while its efficiency and simplicity will appeal to everyone.

The Portmarnock Brick Works, Baldoyle, Co. Dublin, remind architects of the suitability of their facing and moulded bricks for the very best class of facing work. The works have now been in existence twenty-five years, and stand second to none in their reputation for producing a first-class red facing brick. As their works are a county Dublin industry, they certainly have a local claim on architects when specifying bricks. We are really sorry to hear that owing to the deplorable depression in the building trade during the past couple of years, the company, which in the past gave employment to a large number of men and boys, have had to lately somewhat reduce their staff. We trust that is, however, only a temporary measure, the need for which, owing the especial excellence of the manufacture, will soon pass away.

In addition to ordinary bricks, the company make all kinds of arch and moulded bricks, string courses, angles, terracotta 6 in. and 8 in. tiles, terra-cotta swags, and special features to architects' designs.

## LATE BUILDING NEWS.

**Bray (Co. Wicklow).—**PROPOSED NEW PIER AND MOTOR SERVICE.—At the last monthly meeting of the Bray Urban Council, a letter was read from Messrs. Ryan and Purcell, civil engineers, relative to the erection of a promenade pier at the Esplanade and a public Pavilion, and the introduction of a better means of conveyance to the Dargle and Glen of the Downs. The communication suggested that the proposed pier to be constructed about the centre of the Esplanade, that its length should be about 1,000 feet, and that the depth at the extreme end be ten feet. Gentlemen's bathing places might be provided, and a charge of 2d. exacted at the turnstile. A percentage of the receipts could be allowed as a rental, or the amount could be fixed by arbitration. As to the question of a tram service, it was under contemplation whether a service of motor buses through the town to the Dargle and the Glen of the Downs, would not be more advantageous to the district than a permanent tramway. Messrs. Ryan and Purcell suggested to the Council that they should be allowed to deal with the matter as an alternative one, while at the same time they would like to have the Council's views as to which project would receive their approval. The approximate cost of the undertaking, including the erection of a pavilion would be from £25,000 to £30,000. As to the right of the Council to purchase the works when completed, that could be arranged by arbitration. Whatever powers were necessary for the carrying out of the undertaking would be applied for by the promoters, subject to the Council's approval. It was hoped that the explanation given regarding the points mentioned would be accepted by the Council as satisfactory. Any additional information respecting the proposal would be given at the request of the Council.—The Town Clerk said the letter is written by Mr. Ryan, past president of the Institute of Civil Engineers.—Mr. M'Donogh: The subject is a very big one, and I think it would be the best course to call a special meeting of the Council to consider it. It deserves our most careful consideration.—Mr. Lee suggested that in the first instance it would be more advisable to refer the letter to the Esplanade Committee, and the Council so decided.—ENGINEER'S SALARY.—The report of the General Purposes Committee, the adoption of which was moved by Mr. M'Farland, and seconded by Mr. Lee, contained a recommendation that an increase of twenty pounds a year be granted to Mr. Salter, the Council's engineer. Mr. O'Carroll said he was opposed to any increases in the salaries of the Council's officials, having regard to the present condition of the township's finances. The ratepayers could not afford to have the rates go beyond the high figure they had already reached, and he moved that the paragraph containing the recommendation be deleted.—Mr. Jones seconded the amendment. Only a short time since the Council had declined to make an increase in the wages of one of its employees who was receiving only 10s. a week, and when they did so he saw no reason by which they would be justified in increasing the engineer's salary.—Mr. M'Cormick supported the amendment, remarking that when Mr. Salter had got his appointment some years ago he had promised to make an improvement in the roads of the township, and effect a substantial saving to the rates, by supervising the sanitary and public works in Bray, but he (Mr. M'Cormick) was sorry to say that none of these desirable changes had been brought about.—Mr. Plunkett thought the proposal to vote their engineer an increase of salary was nothing short of ridiculous, when on some of the roads of the township were to be found cobble stones as big as turnips.—Messrs. Lee and M'Farland advocated an increase in the engineer's salary, the former describing the action of those who opposed it as cheese-paring.—The amendment was carried by 8 votes to 4, and adopted as a substantive motion.

**COTTAGE HOMES.**—Relative to a paragraph in the report of the Public Health Committee's report dealing with a letter from Mr. A. E. Mills, U.D.C., Kingstown, in connection with plans for cottage homes at a weekly rent of 1s. 6d., Mr. Plunkett proposed as an amendment that the consideration of the matter be deferred until the Council's next meeting, and that Mr. Mills be invited to attend.—The amendment finding no second, fell through, and the report was passed.

**ARTISANS' DWELLINGS.**—At the last meeting of the Urban Council a letter was received from Mr. A. E. Mills, M. Inst. C.E., stating that he would be prepared to submit plans of a cottage which could be let at 1s. 6d. per week.—Mr. Plunkett suggested that Mr. Mills should be invited to Bray to explain his plans.—Mr. Lee said they were not going to play with the question any longer. Mr. Mills and Mr. Plunkett had not given them the slightest information, or said whether the ground rent was included in the estimate for his houses. Mr. Mills had said he would not come down without being paid. He looked upon the proposal to invite Mr. Mills down as only trifling with the time of the Board and delaying the scheme. Their plans would defy anyone to beat them, and their engineer was thoroughly competent to attend to the plans.—Mr. Plunkett said there would be no delay. Mr. Mills did not want the job, but said he would let them see his plans for a small remuneration.

**Dublin.**—The directors of the Great Northern Railway are prepared to receive tenders for the extension of brick arching, 120 ft. long by 26 feet wide, and also the taking down and re-erection of a small office at their Dublin terminus. Drawings and specification at the office of the Engineer-in-Chief, Amiens-street, Dublin, or at Belfast. Tenders, made out on the forms supplied by the company, to be delivered not later than 19th inst.

**New Ross.**—In our advertising columns to-day tenders are invited for the erection and completion of a parochial house at New Ross, Co. Wexford. Tenders to be delivered before 24th March to Messrs. Doolin, Butler and Donnelly, architects, 12 Dawson-street, Dublin.

**Waterford.**—The Presbyterian Church has embarked upon the enterprise of building a new church, and already £1,100 has been raised for this object. Rev. R. J. Macartney, M.A., the pastor, is supported by a band of loyal and helpful office-bearers.

**Wexford.**—PROPOSED NEW TOWN HALL.—The Committee to inquire into the question of a proposed new Town Hall for Wexford, have, we understand, been investigating and inspecting the suitability of several sites in Wexford. In addition to the proposal to build the hall over the present New Market, Bullring, which was the intention of the Corporation then in office to do, we believe that a very desirable and suitable sight in Rowe-street, opposite to the Church of the Immaculate Conception, has been favourably mentioned.

## ENGINEERING NEWS.

**Birr.**—The excavation in connection with the Birr sewerage works has been stopped owing to the fact that the labourers employed, dissatisfied with a wage of 16s. a week, struck work and demanded an increase of 2s. Messrs. Hegarty and Gault, the contractors, say that when asked to tender they were told that the usual rate of labourers' wages in the district was 12s. a week, and on that assumption they based their tender. They are, however, willing to treat with the strikers, and Mr. John Dooly, Chairman of the Urban Council, is making efforts to effect a settlement. About 40 labourers are concerned in the strike, and we understand they have refused an offer of 1s. increase.

**Clonmel.**—The District Lunatic Asylum invite estimates for heating the two new blocks of buildings in course of erection. Tenders to be lodged with me on or before the 26th day of March, 1906.—J. F. Fuller, Architect.

**Ennistymon.**—In our advertising columns this week the Ennistymon Rural District Council invite tenders for the construction and completion of a combined water supply for the town of Ennistymon and Lihinch, Co. Clare. Drawings and specification can be seen on application to the engineer, Brian E. F. Sheehy, Esq., 57 George-street, Limerick, or at the office of the Clerk to the Council, Ennistymon Workhouse.

**Gort.**—Thomas William Roseingrave, B.E., of Limerick, has been elected engineer and architect to the Rural District Council. Mr. Roseingrave is already engineer to the R. D. Councils of Loughrea, Portumna, and Scariff, and in the latter Union is carrying out a gravitation water works scheme for the supply of Scariff and the Union Workhouse. In addition, he has a contract with Tulla R. D. Council for the engineering work connected with the third scheme of labourers' cottages.

**Kingstown.**—The application of the Kingstown Urban Council for permission to raise a loan of £4,217 for the purpose of erecting a destructor for the township has received the sanction of the Local Government Board. The loan is repayable, with interest, in 25 years.

**Limerick.**—The Limerick Gas Committee met specially last week to appoint a gas engineer in succession to the late Mr. P. J. Baker, who resigned recently owing to ill health. There were originally 63 applications, but they were reduced to three, those from Mr. H. Hawkins, Leming Hall, Todmorden, Yorkshire; Mr. J. Taylor, Hollenwood Gasworks, Oldham, Lancashire; and Mr. Loveridge, Seacombe, Yorkshire. The committee (Alderman T. Prendergast, Mayor, in the chair) unanimously elected Mr. Hawkins. The salary is £300 per annum.

**Rathdowney.**—At the last meeting of the Abbeyleix Council a letter from Rathdowney Drainage Committee, in the course of which it was stated that "the people of the district as set forth in the memorial to the Local Government, are anxious to provide a remedy for any faulty drainage in the town. In furtherance of that object we desire to point out to your Council the necessity of having a competent engineer sent to Rathdowney to confer with the committee and plan the details." It was decided to ask Dr. Finn, Inspector, to meet the committee.

**Trim.**—An inquiry has been held by Mr. P. C. Cowan, Engineering Inspector to the Local Government Board, relative to the loan of £4,000 sought by the Trim Urban Council in connection with the projected Waterworks Scheme.



## SEA-COAST EROSION.

The recent report of the Dublin, Wicklow and Wexford Railway Co. told a pitiable tale of the encroachment of the sea, and the constant drain on the purse of the Company to resist its action along a great part of the line. But while such a fact is thus brought very vividly under public notice, especially such members as may be shareholders, it only deals with a fraction of the damage and loss which is constantly occurring along the East coast of Ireland. Quite recently, at Rogerstown, about 10 feet of the sandy cliff fell away and a retaining wall collapsed at Sutton through the undermining action of the sea, and at Wicklow an extremely serious state of affairs exists, which will take very energetic measures to counteract. A conference of English local authorities, held early in February, indicated that the same doleful tale may be told of the southern and eastern coasts of England. At Bridlington it was stated that the Holderness portion of the coast is being eroded at the rate of *11 feet per annum*, while the Chairman of the Withersea Urban District Council complained that, if national assistance were not quickly forthcoming, they would be shortly washed out of existence. The danger, of course, not only lies in the actual disappearance of the land, but that, as at Youghal, a sudden inroad may flood acres of productive country, and for a long period put it out of cultivation. The result of the conference is that concerted action will be taken to endeavour to obtain from the Imperial Exchequer assistance towards the cost of constructing groynes and sea walls and other sea defence works. In many foreign countries the State contributes largely to the protection of the coast, but hitherto it has been considered in Great Britain that, as the land to be defended is private property, the cost of the necessary defence work should be met locally. The new Government, in the midst of its numerous labours, is, however, about to tackle this urgent matter, and Mr. Lloyd George has announced that it is proposed, at an early date, to appoint a Royal Commission to inquire into the question of coast defence and two or three subjects of equal importance to the country at large, such as waste lands and reforestation. This statement naturally gives rise to lively satisfaction, but it is to be feared that the inclusion of other subjects will cause serious delay, which, in the problem of sea defence work, is to be deprecated. It is scarcely probable that any sweeping change will be introduced, such as the Crown taking charge of the coast line and safeguarding all threatened lands at the cost of the nation. It would be undesirable to relieve local authorities and landowners of all responsibility, and improved State aid in the granting of loans for longer periods than at present would be a more equitable solution of the difficulty. More stringent regulations against State departments and private individuals removing beach material might also, with advantage, be drafted, and it should further be arranged that the Crown may abandon its rights over reclaimed lands and thus encourage local enterprise. The Government, having thus early taken the matter in hand, admits the seriousness of delay, and it is to be hoped that some tangible reforms will quickly be laid before the public.

## PRUSSIAN CANAL SCHEME.

Mr. Consul-General Schwarbach, in his report on the trade and industry of Germany, referring to the Prussian canal project, says:—The Bill provides for the construction of a waterway connecting the Rhine and the Weser, with a branch canal to Hanover, the construction of a waterway from Berlin to Stettin for vessels of six hundred tons, besides two minor schemes for the improvement of the waterways connecting the Oder and Vistula Rivers and the regulation of the Oder. The total cost is estimated at £16,728,750, of which £12,557,500 are for the Rhine-Weser Canal and £2,650,000 for the Berlin-Stettin waterway. The Bill establishes a State-towing monopoly for the Rhine-Weser system and the Hanover branch canal, and the principle of tonnage dues for navigable streams. Special regulations for State towing will be issued at a later period. Mechanical towing by private enterprise is prohibited, and special permits are required for the use of these waterways by vessels propelled by their own motive power. The introduction of the towing monopoly was advocated as a means of abolishing the prevailing competition between railways (the railways are practically all State owned) and waterways, and as a means of organising a forwarding service on uniform lines with fixed deliveries and freight rates. Lastly, the towing monopoly will enable the Government to extend its tariff policy both

over waterways and railways. It remains to be seen whether the substitution of the State management for private enterprise will fulfil the expectations raised by the advocates of the monopoly. Its adversaries point out that the tariff policy of the Government may be influenced more by fiscal than by economic considerations, which is a frequent complaint with regard to the State railways. The tonnage dues on navigable rivers are to cover the interest and charges for remediation on the sums expended for the regulation and deepening of such streams in the interest of shipping. The Prussian Diet passed a resolution urging the Government to introduce Bills for the canalisation of the Mosel, Lahn, and Saar Rivers, in West Prussia, and for the construction of the Masuric Canal in East Prussia. The canalisation of these tributaries of the Rhine would benefit in the first place the iron industries of Lorraine, Luxemburg, and the Sieg district, and, by thus enabling them to obtain coal and ores at cheaper rates than now, increase their competitive power. The Lorraine and Luxemburg iron manufacturers are to a large extent exported. The rapid strides made by the Rhine ports, Ruhrort and Duisburg, are principally due to the extension of the German coal and iron industry in the west and to the great improvements in the Rhine navigation, more especially in the middle and upper reaches of the river. These improvements have benefited to a very great extent the two ports of Mannheim and Ludwigshafen, on the Upper Rhine.

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## TOPICAL TOPICS.

Messrs. W. H. Byrne and Son, architects, of Suffolk-street, Dublin, are inviting tenders for extensive alterations in a church in the Co. Kilkenny.

A new residence is being built, and is now roofed, near Malahide for Mr. J. G. Jameson. Messrs. Batchelor and Hicks are the architects.

Mr. R. G. Allanson-Winn, M.I.C.E., has been appointed to act as engineer for the important works shortly to be undertaken at Arklow Harbour. Mr. Winn's special experience peculiarly fits him for this responsible post.

The Board of Works intimate in our advertising columns that builders desirous of tendering for the retaining walls, vaults, foundations and walls, etc., up to the ground floor level for the proposed new building about to be erected in Upper Merrion-street, Dublin, for the Commissioners of Public Works, can now obtain bills of quantities and forms of tender on application to the Secretary, Office of Public Works, Upper Merrion-street, Dublin, on the payment of £1 ls., to be returned on receipt of a *bona fide* tender.

The drawings and specification, etc., may be seen at the offices of the Commissioners. Tenders to be delivered addressed to the Secretary, Office of Public Works, Dublin, before noon on 4th April, 1906.

We are glad to see that this important work is now about to advance a stage further, though it seems strange that the entire contract should not have long since been put up for tender.

The Rathmines and Rathgar Extension of Boundaries Bill was last week rejected in the House of Commons on the motion for second reading by an enormous majority. The Bill was made a purely party vote, the Opposition voting in its favour, the Government and Irish Nationalists against it. For this reason it is difficult for us to comment on the matter with any degree of freedom, further than to say that we hold the claim of an urban district to annex a portion of a rural district to need very convincing evidence to prove the necessity for such a measure. We formulated identical views in regard to the Dublin Corporation Bill of a few years back, when a large slice of the County Dublin was absorbed into the City. There are two important arguments against such annexations: the one is that the municipal debt of these countries as a whole, in the piling up of which the rural ratepayers have had no voice, has reached its limits, and the burden of taxation has become so great as to call for serious consideration with a view to economy and retrenchment. The other point is that rural districts can, and do, in all parts of the kingdom carry out sanitary and other improvement works of the most extensive character, and that as governing bodies they compare favourably with Urban Councils, while of course the rates struck are, making all due allowance for the different conditions, more moderate.

A house is being erected at the Curragh for Major Loder, from the designs of Messrs. Kaye-Parry and Ross.

The unfortunate state of Bray Harbour formed the subject of some pleasantries at the last meeting of the Urban Council, one member suggesting that it should be utilised as a graveyard, owing to its dry soil it was specially adapted for that purpose.

The Greystones Harbour is, however, in a far worse plight, the money spent upon it being absolutely gone for nothing. The whole of the south groin has absolutely "turned turtle," and lies in detached masses in the water. The north pier gives every indication of a similar fate if steps are not soon taken to remedy the defects.

On Tuesday week Mr. W. J. Gilliland, of Belfast, delivered a lecture before the Architectural Association of Ireland, which we publish and comment on elsewhere. It goes to the root of the question, and shows the absolute interdependence of the two questions of "Statutory Registration" and "Education." Without registration and compulsory examination students will never be got to devote themselves enthusiastically to the study of their profession and to a hard curriculum, while without a broad leaven of education the claim for registration will not forcibly appeal to outsiders. Architects must first show themselves to be educated "professional men" before they can claim the rights and privileges properly pertaining to a learned calling.

Last week we paid a visit to the new works of the Galway Granite Company and to the Shantallow Quarries, and were greatly pleased at the progress which has recently been made. The new works, situate on the banks of the Corrib, and now almost completed, are of large area, and nothing like them has ever before been projected for Ireland. The works proper comprise a workshop and machine-room of great extent, and therein have been installed the latest stone-working machinery, all made by the Bramley Engineering Company, Leeds, and comprising several machines capable of handling the largest blocks with ease; the larger lathe will handle and polish granite columns of the largest diameter. An up-to-date adjustable rotatory polishing table has also been laid down, while all the work benches are supplied with pneumatic power, which is further available for stone carving. The building itself, which is of the simplest character, has been most expeditiously erected by the company's own men under the supervision of the capable and energetic manager, Mr. Seale. Fortunately, too, the company had the benefit of the help of Mr. Lyburn, the geologist to the Board of Agriculture and Technical Education, and whose advice has been invaluable. The necessary power required will be derived from two turbines, one of which developing 60 h.p. has already been completed. The works will be lighted by electricity. The quarry at Shantallow has been further opened, cranes fixed, etc. The stone is being got out in extremely large blocks, and the colour has greatly improved.





### ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

#### Mr. Gilliland on Education.

We were favoured with a most vigorous, clear, and concise paper from Mr. Gilliland, which, as the president said, in putting the vote of thanks, was like a spur to our jaded energies.

This breeze from the North ought to make us careful that in this matter we do not let the metropolis take second place—a circumstance not at all unlikely to occur, unless we move soon and move strongly.

#### Action.

Surely the time is ripe for something more than the diffident, half-hearted discussion this question has, at the best, received as far as the general members are concerned. There should be a special meeting convened to discuss the matter, at which all those who care anything about it should attend to give their views for or against. It would be far better to give up the whole scheme than to have it hanging on in its present moribund condition, wearing out the patience and hope of those who have interested themselves in it. It is a fact that out of 60 circulars sent to architects practising in Dublin asking what measure of support the proposals would be likely to receive, only four were answered.

#### Compulsion.

We would feel it necessary to apologise for harping on this theme of education so much, were it not for our conviction that it is quite the most important question of the day as far as the Architectural Association is concerned. We are, however, brought back again to the old difficulty of the open door to membership of "The Institute," as the more the question of indifference on the part of students is discussed the more clear becomes the belief that they won't work unless they have to. The only way we can see of compelling effort is to make the prize difficult of attainment.

#### The Competitions.

It is now full time that all those intending to enter for the various prizes should start work in earnest, as the time is becoming short.

#### The Class of Design.

We are glad to notice a distinct improvement in the drawings submitted, the plans on the whole seem well worked out. Possibly there should be more attention given to simplicity in the exteriors, but without mannerism. It would be well if stone construction were more thought of, and brick with rough cast given a rest.

### THE WELSH SLATE TRADE.

Owing to the very large imports of foreign slates, more especially from France, into the home markets, the Welsh slate trade is at present very much depressed. Both the slate quays in Wales and the quarry banks are greatly overcrowded with slates, and enormous stocks of the foreign slates are also held in several of the English ports. The result is that the trade shows no improvement, though it is believed that bottom has now been reached, and that merchants may look forward to see their overgrown stocks soon diminishing. It will be a long time, however, before the quarriesmen will benefit owing to the enormous accumulations now existing. Wages have been reduced in some places to the extent of 15 per cent. on those ruling six months ago. One hundred men, one-eighth of the total number employed, have recently been discharged from a single Welsh quarry, and in others the men are glad to be allowed to work only four days a week.

### COPYING PLANS.

#### A New Photo-Printing Process.

The most general method of reproducing plans at present in use is to take photographic prints in which great advances have been made during the past fifteen years. Blue prints have hitherto been the cheapest copies obtainable, but they have been gradually replaced by ferro-gallic black prints on white paper, which in turn have given place to the permanent carbon black line produced by means of a sepia negative. The fact that the last named process can be made at the shortest notice, and that defects in the original drawing or tracing can be stopped out in the copy are sufficient to explain its general adoption. But although very good results are obtained by these systems, they are accompanied by some drawbacks more or less serious. The copies can only be taken on specially prepared papers, which must be stocked in varying thicknesses and widths to suit different requirements, and if they are not used within a reasonable period they deteriorate rapidly. The great disadvantage, however, attaching to all these photographic processes is that the copies have to be washed and dried, and consequently shrink, rendering the scale inaccurate, and thereby introducing the possibility of serious and frequent errors. Even where photo-lithography, a very expensive process, is requisitioned, as is the case when copies are required on special hand-made drawing papers, tracing papers, and tracing cloths, the results are not true to scale. Considering the great increase in the use of photo-prints, it is not to be wondered at that the defects in the prevalent systems have become more and more apparent, and that the want of an accurate and inexpensive reproducing process should be keenly felt. Messrs. B. J. Hall and Co., of 39 Victoria-street, London, S.W.—the firm that introduced the Electric Copier—have, as the result of a series of experiments, hit upon a new process by which true scale copies on hand-made drawing papers can be produced at a lower cost than that of blue prints. It may be described as gelatine-lithography, and depends on the use of a colloidal compound which Messrs. Hall have called "Ordoverax." The system is not difficult to operate, and can be quickly learnt. The material—"Ordoverax"—is first heated in a suitable apparatus to a temperature of about 130 deg. Fahr., and is then transferred to a can with a rectangular spout. While the material is being heated a sheet of metal or glass is prepared, and placed on a board which can be tilted, and which has at the bottom a trough for draining off the superfluous liquid. The Ordoverax is now poured on to the plate so that a layer of a uniform thickness, varying from 1-32 to 1-16 of an inch is formed. The board is then lowered to a horizontal position, and the Ordoverax allowed to set. An undeveloped blue print of the drawing or tracing required to be copied is now brought into contact with the Ordoverax, and a slight pressure applied all over it. It is then removed when the lines of the drawing show distinctly on the impression, and by careful rolling, which is by no means difficult, it will be found that the ink remains only on the lines of the drawing. After inking a copy can be taken by placing drawing paper, tracing paper, tracing cloth, or linen on the Ordoverax, and applying pressure, preferably by a roller. A reproduction is thus obtained in clean, clear black lines, the rest of the cloth or paper remaining quite white. As many as twenty prints can be taken of each thickness of the Ordoverax, depending to a large extent on the thickness of the Ordoverax, the plate being freshly inked for each copy. If there are any lines or letters on the blue print which it is not desirable to reproduce, they can be obliterated by simply covering them on the plate with a piece of clean paper. After use, the Ordoverax can be either scraped or peeled off and used again a dozen times. Messrs. B. J. Hall and Co. have fully tested this system, and recommend it with every confidence to all who make photo-prints. Only one kind of photo paper is needed, and that the cheapest of all, and Messrs. Hall are prepared to show the process in operation at any time by appointment. They will themselves make reproductions on paper or cloth at reasonable prices, or will supply outfits for working the process. They will also send trial sample prints post free for half price.

Messrs. Helliwell & Co., Ltd., of Brighouse, Yorkshire, and 17 Nassau street, Dublin, have received the contract for the glazing, on their patent "Perfection" system, to the new potato shed roof at College Goods Station, for the North British Railway.

## ARCHITECTURAL EDUCATION.\*

When the genus "Homo" appeared on this terrestrial sphere, whether as the result of evolutionary change carried on through long periods, or a single creative act, we need not stop to enquire, we find the race possessed of those faculties in a limited degree which pre-existed in that power from which all nature has been derived.

Man possesses in a greater or less degree creative ability, which pre-supposes intelligence, power, appreciation, and satisfaction in his own creations. But as an incentive to the exercise of those powers with which he has been endowed his physical nature requires that he shall provide for himself a shelter from the winds and the rain, from the excess of cold and heat, in which he may rest himself and lodge his offspring in their tender years; clothing suitable to the climate of his environment; appetite desiring variety of foods; mental and emotional faculties which seek satisfaction in the contemplation of objects possessed of certain qualities of form, harmonies of colour, rhythm and combination of motion and sound, and in the exercise of his imagination.

As his powers of observation and knowledge increase, he sees in the nature which surrounds him the perfect adaptation of means to end ever accompanied by that regard for form and colour which he learns to call "beauty," and at the same time apparently an utter abhorrence of exact repetition, the absence of which he describes as "variety." Ever as his experience increases he becomes cognisant of the greater complexity, capabilities, and beauties of all natural objects as revealed to him by instruments and methods which, owing to the development of those creative powers which are inherent in his nature he learns to construct and employ.

As his knowledge thus develops by the continuous use of his faculties, his desire to create by the application of new forms or the modification of old ones, that which will serve purposes of use or satisfy sensuous or intellectual ideas is further stimulated. This constant striving after improvement and novelty we term "Progress."

If this were the only influence at work, I fear that the result would not prove very satisfactory, as indeed some extreme efforts at originality are not, but as a balancing power comes in memory, coupled with the association of ideas, which induces the repetition of forms and combinations previously existing which are loved either for their own inherent suitability or beauty, or because of some pleasurable emotion associated therewith. This influence, tending to restrain and retard progress we may, for lack of a better word, although not entirely suitable, call "Tradition."

Having endeavoured to find a philosophic basis for Architectural Art, and suggested the two dominating principles which regulate its growth and development, we have laid a foundation for the proper understanding of the broad principles on which the training of the individual to become a true Architect should proceed; but our complex modern civilisation and the methods derived from them of constructing architectural works, as well as the social and economic questions involved, introduce new factors which also demand consideration.

It is obviously the first duty of education to train the faculties, both mental and physical, to develop all the latent powers of mind and body to the fullest extent, so that the subsequent acquisition of knowledge may be the more easy, and the application of the knowledge so obtained to the attainment of desired results may be the more perfect.

Although you have all passed the elementary school stage, and the consideration of the early training of the boy can have no practical value, yet I may be allowed here to enter my protest against the ill-conceived methods that generally hold; although it may be of advantage to the memory to train it to retain abstract facts not understood by the intelligence, yet, surely, the memory might be equally well developed by the endeavour to accomplish the much easier and more valuable task of remembering facts and principles well understood, and thoroughly digested; and why should that most valuable training of the hand and eye and powers of accurate observation acquired in learning to draw not receive much earlier and careful attention, in stead of its being treated as an extra subject, only to be placed within the reach of the few.

If the young Architectural Student has not received this training by learning to draw accurately and well at an early age, he must begin to repair the defect at the earliest possible moment, and until he has attained facility in drawing correctly from objects, and has some appreciation of line and curve, he is not fit to commence any specialised studies for the profession.

His general education obtained in the Intermediate or Secondary School should be of the most liberal kind, English, Mathematics, French, and German, and, if possible, Shorthand and some knowledge of Bookkeeping, and perhaps most important of all, Experimental Science teaching and Manual Instruction should be commenced, while Drawing, entirely confined to that which will increase those powers which I have already indicated, such as drawing from the cast, the antique, and the figure, should be persisted in under the instruction of a competent Art Master, who is sympathetic, and not a mere technical teacher.

Some knowledge of Natural History, and especially Human Physiology, it may be gathered, I think, from previous remarks, I consider absolutely essential.

If an architectural pupil has not been fortunate enough to acquire these subjects before leaving school facilities exist for repairing the omissions, and I would strongly recommend this to be undertaken at the earliest moment possible.

In April, 1902, I gave evidence on behalf of the N. Soc. A. before the Royal Commission on University Education in Ireland, which was reprinted from the Blue Book and published. On that occasion I advocated a University training, somewhat specialised for architectural students, and that diploma should be granted which would exempt the student from the Preliminary and Intermediate Examinations of the R.I.B.A., the curriculum for such to be settled by and under its control.

I was very much struck when examining the Report of the Board of Architectural Education of the R.I.B.A., published in June of last year, how very closely in general principles that report followed the lines of my suggestions.

I think I cannot do better than quote from that evidence:

"I think the time has arrived when a University Education should be superadded to the technical training obtained in an architect's office under indentures of apprenticeship, as there are many subjects which ought to be studied by the young architect, a knowledge of which cannot be acquired in an office, and, in addition, the ordinary liberal education cannot be sufficiently advanced at the age at which youths usually become indentured. In some rare and exceptional cases, private study may, to some extent, compensate for these disadvantages; but the absence of direction, assistance, and facilities very much reduces the effect of the most persistent efforts of the most conscientious student. On leaving school, the intending architectural student might pass a matriculation examination similar to that for the Arts course in a University, with a modern language in lieu of Latin, and spend, say, one year in College, still keeping up the School of Art classes as well, before entering an architect's office. Then comes the period of apprenticeship, which it is highly desirable should be for five years, and during, say, three years of that period attendances should be made at College classes, with a special curriculum, a modification of the course for the B.A. degree, with special subjects added, suited to the requirements of the architectural students. These classes might be arranged partly as day classes, partly as evening classes, so as not to interfere with the still more important technical training obtained in the office.

"Were this idea carried out it would be necessary to establish a Chair of Architecture, which would deal with the subject more from the fine art than technical side, and embrace architectural history and literature, avoiding the strictly archaeological aspect, dealing rather with the effect of the habits of the people and the influence of local material in forming architectural style; arts allied to architecture, such as painting and sculpture, in their decorative aspects; furnishing and fittings also, from the point of view of true artistic design, which, of course, includes utility. All the other subjects required are already taught in Queen's College, Belfast—inadequately, perhaps, from lack of sufficient equipment; but the course might be shortened and arranged to suit the special requirements of architectural students. They are as follows:—Languages—French and German. Natural Science—Elementary Mineralogy, Geology, Zoology, and Botany. Elementary Mechanics and Physics; Elementary Engineering, the theory of construction, stresses, strains, and strength of materials; Hygiene, and Architectural Jurisprudence.

"The advanced stages of drawing should be taken during some portion of the period at a school of art where drawing from the round, from life, and possibly some water-colour work, are the more important subjects, all from the fine art side; sufficient technical drawing is done, and done better, in the office.

"A diploma or degree obtained as the result of successfully passing an examination in the foregoing subjects would render unnecessary the preliminary, and portions of the intermediate, examinations for the R.I.B.A. Associate's qualification, and I should anticipate that sooner or later

\* Paper read by Mr. W. J. Gilliland, F.R.I.B.A., ex-President of the Ulster Society of Architects, before the Architectural Association of Ireland, March 13th, 1906.



the R.I.B.A. would require each student to have such a diploma before admitting him to the more purely technical and artistic examination for the associateship.

It is only by such a general course of training as I have indicated that the young architect can be educated up to the requirements of the times; only by such means can he obtain the facility for acquiring from day to day the ever increasingly necessary knowledge to enable him to deal satisfactorily with the problems which are presented in his practice, involving almost contradictory and incompatible qualities—the science of the constructor, the imagination of the artist, and the level head of the man of business.

"If such facilities were provided and availed of, in the course of a short time the whole tone and status of the legitimate architectural profession would be raised; the intelligent section of the public would recognise that in order to secure competent architectural assistance an architect possessing the recognised qualifications must be selected, and individuals would be protected, if they exercised that care, from falling into the hands of incompetent persons."

I think most of you will agree with me that such a training as I have sketched, with an important addition which I will discuss again, would very fully equip, as far as education could do so, a young man for the practice of architecture. Are we likely to get the facilities? I see no reason why we should not, if we agitate for them properly. It is purely a question of wringing money from some source. It may be from a reluctant Treasury—it may be from private beneficence.

Some little time ago a deputation from the Ulster Society of Architects waited on the President of Queen's College, Belfast, to advocate the establishment of such a course, and we were received most sympathetically. We endeavoured to excite compassion by appeals "ad misericordiam" to some whom we thought might help us to provide the necessary funds, but, so far, have not received any adequate response. We do not, however, despair, and we mean to renew the effort wherever a suitable opportunity presents itself. I cannot help saying, however (and I hope you will not attribute to my remark any political significance, as each party is equally bad), that it is a public scandal that education of a purely secular character should in Ireland be starved because of a wretched clerical quarrel.

Some weeks ago I had an opportunity which I availed myself of to suggest to your progressive Provost of Trinity College the desirability of the establishment of a lectureship in Architecture in his College, and an arrangement of other classes such as I indicated, to suit the requirements of your students. I would suggest to you the extreme desirability of following up this matter, and I think I may assure you that if ways and means can be arranged, you will not meet with a rebuff. This is a subject for which you have certainly the right to claim the sympathy and demand the support of the R.I.A.L., neither of which, I am sure, will be withheld.

One item of training, of primary importance, I have not as yet dealt with—the practical training that can only be obtained by close observation of actual building operations. If there is any subject which is neglected, in my experience, by the architectural student it is this. The Board of Architectural Education Report suggests as a substitute the laboratory or workshop training of architectural schools; but that is not sufficient, and is, to some extent, misleading, as proper grasp of scale is not obtainable from models, especially by young students.

Excuse my digressing from my subject for a moment, to glance at the Report. Speaking generally, as I have already hinted, I agree with its recommendations, which are, on the whole, admirable. But it has one serious defect—it is considered almost wholly with reference to London and one section of London practice. A large London office is probably the very worst place for a young architectural student to commence his training, hence the undue prominence given to school work over that in the office, and the substitution of the laboratory for the actual buildings (although, to be quite fair, it is stated that "training in the workshop should be supplemented by visits to buildings in course of construction, under competent guidance").

True, there was an advisory Board, on which your Association was represented; but my experience of advisory Boards is that their advice is only asked when it is too late to be of any practical service. Had provincial influence been exercised, I am satisfied that some modifications would have been suggested to suit local circumstances.

To return. Some arrangement whereby students could be compelled to spend considerable time on works and in contractors' workshops, closely observing the execution of works, especially of those for which they had been engaged on the plans and details, would teach more in one month than all other methods would do in a year. The old idea of

serving one's time at the bench, as it was called, is, of course, exploded. It is not necessary that an Architect should be able to execute handicraft work; but unless he knows how it is done he cannot design it, and to know how it is done he must, at least, see it done.

No doubt, many will consider that I have laid myself open to the charge of promulgating Utopian ideas, that such a course as I have outlined is too extensive, and the facilities desired impossible of attainment. Why should our aims not be towards the best, and our aspirations the highest? It cannot be denied that at present they are impossible; but that is no reason why we should not form as perfect an ideal as possible.

Several causes exist to seriously retard progress and delay the consummation of our hopes.

There is an absence of enthusiasm in our junior ranks, a refusal to take life seriously; the love of ease, pleasure, and sport predominates over the intellectual satisfaction resulting from the acquisition of knowledge and the development of the higher faculties, and what is, perhaps, still more potent, the lack of inducement for a young man, under existing circumstances, to undergo such an arduous and prolonged training to qualify himself for a profession which is open to any person, no matter how incompetent, or even illiterate, who chooses to write "Architect" after his name.

No provision of education facilities however ample will ever elevate the status of the profession and put it on a proper footing until the door is closed against the further entrance of incompetent men for the simple reason that such facilities will not be availed of except by the very few.

The absence of a "statutory qualification" is the great, the insurmountable bar to all adequate educational progress.

Given this protection, the demand for improved education would speedily arise, and once the demand is created a means will be found to supply it without delay.

With the younger members of the profession and those entering it I sincerely sympathise in the desire to eliminate the disastrous competition arising from the pseudo-architect, and the disheartening effect of seeing building after building entrusted to those who possess neither architectural training nor instinct, but who are gifted instead with the, to them, far more important power of gulling the public.

I feel that I am on safe ground in appealing to you (I know your sentiments) to support by every means in your power those of us who are endeavouring to fight your battle for legislative recognition. I say *your* battle, because to us who have at least attained the meridian of life it cannot now much matter, but we have gone through it ourselves, and we see the effects on our junior brethren, we are conscious of its blighting influence on the art of architecture, and we are determined to spare no exertion and relax no effort until we have attained the end for which we have been struggling for more than twenty years. It is a sad and depressing fact that those who are keeping back this essential reform are the very men who should be in the van of every forward movement.

I do not for one moment mean to insinuate that they are consciously injuring the profession of which some are distinguished ornaments, but owing to the impossibility of their putting themselves into the position of their humbler brethren they cannot see the disastrous effect of their conduct. It is a mercy for their reputation that the absence of sense of proportion and perspective is only moral and does not affect their architectural design.

The opposition is unconsciously selfish, the arguments used against registration group themselves round two heads. The first used by the "Art" men is:—You cannot examine in "Art." What they mean by this is not at all clear to me; I wonder do they really understand it themselves. If there is no standard of Art by which a design can be said to be good or bad, how comes it that they claim that their designs are good, is it not equally open for any one to say their designs are bad, and would not we be treated to a nice show of righteous indignation if we hoist them on their own petard? Is it not obvious that their own pretensions prove that they recognise a standard in architectural design? It is put by some in another form. It is derogatory to Art to attempt to examine an artist. Is it suggested that these wonderful architectural prodigies have sprung like Minerva full-grown and armed with her ægis from the brain of Jupiter, and that those who suggest any suspicion of perfection and who have the temerity to pry into their superior pretensions shall share the fate of those of old who looked on the terrific head of the Gorgon Medusa which constituted the adornment of the ægis?

It is quite true that some are born with an inherited gift of artistic imagination, and such may become great architects, but do they become such entirely by instinct, and why should it be unnecessary for them to receive any training, and if they receive such training, wherein lies the difficulty or how is it derogatory to their art that the only means pos-

sible of ascertaining their superlative powers that of examination is resorted to?

How many of our foremost architects at the present day, even the strongest opponents of examination, have first shown their abilities by competition for the Soane Medallion and the Travelling Studentships? What are these but examinations in Art? and was not the winning of one of these prizes in many instances the first step on the high-road to professional reputation and subsequent success?

But we cannot all be great architects; many of us must be content to remain only mediocrities; but if we cannot attain even that humble position through lack of the requisite natural ability, would it not be far better for ourselves and most certainly for architecture that we should be forced into some other sphere of action, and ourselves and our land saved from the perpetration of monstrosities, by rejection at examination?

The second great argument is that it is proposed to "hall-mark" incompetent men. This has an element of plausibility, but very little practical value. These incompetent men have "hall-marked" themselves by the self-assumed title of "Architect," and we have been powerless to prevent them. Because we have been helpless in this respect in the past, is that a good reason why we should refuse to arm ourselves to prevent its recurrence in the future?

No doubt we would all prefer to strip such persons of the title so surreptitiously acquired, but that is a known impossibility, and why should we persistently refuse a future protection because we cannot obtain an absolutely ideal present?

I have not time to discuss the various subsidiary arguments alike sophistical and illogical. Any stick is good enough with which to beat a registration dog. But I am convinced that whether they be English bull-dogs, Scotch collics, or Irish terriers, they have got their teeth in and will not let go until they have won the fight.

But what has this question of "statutory qualification" got to do with "architectural education," you may ask? I answer: Everything. That once obtained, education will at once commence with enormously increased impetus.

Let it not be assumed, however, for one moment that until this necessary legislation is obtained we can afford to wait for the facilities which we anticipate will come in its train. Time is precious, and once past is beyond recall; besides the promotion of education will expedite registration.

I have heretofore dealt entirely almost with ideals towards which we should strive, but which are for the present unattainable, and I should like to devote a few moments, although I am afraid I have already wearied you, to deal with what you may do for yourselves in the present. I very much fear, however, I shall be "carrying coals to Newcastle" in any counsel I may give; or, rather, to improve the figure, I shall be bringing from the bleak North dull and lustreless metal to lay beside in this sunnier climate the bright gold of advice and direction contained in the inaugural address which your President was good enough to forward for my perusal, which has apparently been further developed by a report prepared by a sub-committee of your Association, and a draft syllabus of a three years' course of classes.

I entirely endorse the view that you should adopt the R.I.B.A. curriculum. I do not for one moment claim that it is perfect. It does not quite square with the report on Education, and it will require modification, but for the present it is the best you can get, or are likely to get. The examinations are also faulty and require to be adapted to some extent to local circumstances without losing their universal character. They certainly want to be de-Londonised, if I may coin a word, and this I am quite satisfied they will be ere long, as I am convinced that the Council of the R.I.B.A. are conscious of the necessity for improvement in this respect, the influence of the representatives of allied societies steadily making itself felt in its deliberations.

In addition, the advantage of a qualification which will carry its possessor anywhere is too great to be lost sight of, and I hope to see some at least of the students whom I see here making a name for themselves, in common with distinguished Irishmen of other professions, beyond the rather narrow confines of our own Emerald Isle.

I would therefore say to you, go on in the course which your Committee has recommended to you, and in addition do not neglect your drawing at the School of Art and your visits to works in progress. But above all things "be in earnest." You have entered on a profession in which you will either succeed and make a name for yourself, or remain a drawing-office drudge to the end of your days. Which is it to be?

Perhaps that is appealing to you in a too matter of fact and mercenary spirit. Consider what scope and variety the profession gives for the exercise of our varied talents, and what pleasure may be obtained from the successful solution

of the various problems set us. The convenience of plan, the adaptation of material to constructive requirements combined with beauty of form and colour, the massing and grouping of the structure, the harmonising with the surroundings so that our buildings may form part of a perfect picture, as our imaginative creation takes concrete form if we attain success, how we are repaid for many hours of weary study. Lack of appreciation from an undiscerning public we may find and many troubles, but if we deserve success be sure that sooner or later we shall get our reward.

## REVIEW OF CATALOGUES.

We have been favoured with one of the latest catalogues issued by the **Phoenix Engineering Co., Ltd.**, Phoenix Works, Chard, England, and containing particulars of many appliances suitable for builders, contractors, and municipal bodies. The Phoenix Company have made a speciality of this class of work, and the amply-illustrated catalogue issued by them will be found most useful by those for whom they are intended. It would be impossible in the space at our disposal to deal fully with all the articles described in the catalogue before us. We shall, therefore, merely mention some of the more important items, and refer our readers to the catalogue itself (which can be had on application) for further particulars. The following are some of the salient features of the catalogue:—"Phoenix Rapid," tar, pitch, and bitumen boilers, horizontal and vertical patterns; apparatus for the conveyance, distribution, and pumping of tar; rock asphalt cauldrons, mastic asphalt boilers, asphalt tools, barrows and rollers, macadam and concrete mixers, road sweepers and scrapers, and road rollers; and a variety of carts for dealing with street refuse, as well as watering carts in great variety. In the department devoted to pumps, full particulars are given of the various patterns of the celebrated "Highland" and "Flood-gate" pumps, both hand and force, also diaphragm pumps, rotary pumps, and chain pumps, with hose and all necessary fittings. Amongst other specialities of the firm are portable forges, crab winches, friction hoists, shear legs, derrick cranes, manhole covers, portable offices, tip waggons, barrows, etc. The Phoenix Company also make a speciality of all kinds of cast-iron tank and plate work, constructed either circular or square, or square with rounded corners. The firm will be pleased at any time to quote for special municipal appliances and contractors' requisites differing from the standard articles illustrated in their catalogues.

**Messrs. Moffatts, Ltd.**, 155 Farringdon-road, London, E.C., submit the "Brilliant Book," which is their catalogue of the "Lucas Light," the "K," and the "Sydney Lamp." The "Lucas" Incandescent Self-Intensive Gas Lamp is well-known as one of the best of the high power gas lights. It is in general use, and rapidly growing in favour for lighting public buildings, shops, warehouses, etc. It is made in single burner varieties, from 200 to 1,000 candle power, and in cluster combinations from 400 to 2,100 candle power. The "K" inverted burner has also been very successful, having been welcomed as a great improvement in appearance and lighting power on the ordinary incandescent gas lamps. The "Sydney" lamp is an offshoot of the "K," consisting of an inverted cluster light. This will be found an artistic and high power lamp for indoor use, and is also made in special patterns for outdoor lighting. It gives 250 candle power, with a gas consumption of 10 cubic feet per hour. The "Brilliant Book" also illustrates a beautiful selection of brackets, pendants, shades, globes, etc., and will be found most interesting by gasfitters, public bodies, and private consumers.

Another catalogue of interest to gas-consumers is that issued by **Messrs. John Wright and Co.**, Essex Works, Aston, Birmingham, dealing with their "Eureka" Gas Cookers, etc. This booklet contains full particulars of "penny-in-the-slot" and other gas-cookers, grills, hot plates, boiling burners, high-pressure boilers, washing coppers, smoothing iron heaters, stoves, and other useful appliances, which can be economically applied with gas as fuel.

The Chester-le-Street Small Pox Hospital is being warmed and ventilated by means of Shorland's Patent Manchester Stoves, supplied by Messrs. E. H. Shorland and Brother, of Manchester.



## THE BANN DRAINAGE.

## Sir A. Binnie's Report.

The report of Sir Alexander Binnie on the Bann and Lough Neagh drainage was issued on the 12th inst.

He states that he devoted the time from the 7th August to the 26th September, 1905, to a thorough investigation of all the circumstances of the case. The general result of his investigations convince him that the whole question is much more difficult and complicated than a first view would lead one to assume. This to a large extent arises not so much from engineering difficulties as from the conflicting interests involved, as there have to be taken into account not only the flooded lands, but the considerable navigation now carried on between the Lagan Canal and the various points on the shores of Lough Neagh, while on the Lower Bann, from Toome to the Cutts of Coleraire, the question is complicated by the valuable eel and salmon fisheries on the river and by the existence of navigation, which was carried out on the lines suggested by Mr. McMahon in his report of 1845.

"As to the damage caused by floods on the shores of Lough Neagh," he says, "the opinions expressed to me were somewhat of a varying character. While there appeared to be a consensus of opinion that large winter floods which submerged the land for some months were the principal cause of complaint, some desired that all floods should be entirely prevented, while many others expressed the opinion that partial floodings, lasting for only a few days or weeks, not only did no harm, but was in some cases of a positive advantage. On all sides there was, however, an unanimous consensus of opinion that the summer level of Lough Neagh should not be reduced, and I was much impressed by the considerable traffic which passes from Belfast through the Lagan Canal to Portadown, Moy, Coalisland, Antrim, Newry, Trench, Ballyronan, and other points on the shores of the lake."

Owing to the heavy rainstorm of the 25th and 26th August, 1905, there is one fact which he was able to certify and to place beyond dispute—viz., that considerable flooding, although of a temporary character, occurs, and must occur, on the Blackwater and the Upper Bann, even when the lake is at its summer level.

"In fact, for some weeks previous to that rainstorm the lake had been below the summer level, and I heard of complaints being made on this account, but the flooding caused on this occasion was no more than might be expected as due to a similar rainfall in any flat area in England or Scotland, and soon passed off the lake. I should remark that the damage done on this occasion was principally due to the late hay harvest and the washing away of hay cocks, which, according to the custom of this part of Ireland, are left standing in the fields till late into August, September, or October."

Dealing with the drainage area, the character of which he described in detail, Sir Alexander Binnie points out that the total area draining down to the Cutts of Coleraire is 2,216 square miles. This, as far as he could make out, is almost 16 square miles in excess of former estimates. Within the drainage area of Lough Neagh and lying between its shores and the foot of the hills is a large area of low-lying land. He roughly estimates that of the total area of 1,749 square miles draining to the lake about 643 square miles lie below the level of the 250 feet contour; in other words, only averaging about 100 feet above what is called the summer level of the lake. These circumstances lead to the flooding of the low areas near the mouths of the rivers entering the lake, particularly in the lower parts of the Upper Bann and the Blackwater. Consequently the rapidity with which floods are discharged from the surrounding mountains is somewhat checked, besides which the large area of Lough Neagh—151 square miles—also modifies the intensity of flood discharge down the Lower Bann.

For the purpose of estimating the flood discharge, he investigated the rainfall at forty-three stations contiguous to the drainage area of the Bann. To establish a standard he abstracted from Symon's British Rainfall the long records which have been kept for forty years at—

- (1) Banbridge (Milltown).
- (2) Armagh Observatory.
- (3) Garvagh.
- (4) Queen's College, Belfast.

Each year in each case had been reduced to a ratio of the mean, and for the purpose of examining the other records and reducing them from their arithmetical to probable mean falls the average ratios of 1, 2, and 3 have been taken. From these average ratios it will be seen that the wettest year was 1872, rising to 36 per cent. above the average, with 224 wet days in the year, but in the cases of No. 1 (Banbridge) and

No. 3 (Garvagh) it will be noticed that the rainfall was 48 and 40 per cent. above the average, with 239 and 238 wet days respectively. But it is necessary to take into account not only the wettest but the two consecutive wettest years on record. These appear to be 1876-77, when it was 16½ per cent. above the average, and 1871 and 1872, when it was 15 per cent. above the average. The above consideration should be borne in mind when flood discharge is being considered.

"A general review of the meteorological conditions of the district to be dealt with leads us," he says, "to a conclusion that the greater portion of the area is subject to a rainfall of 30 to 38 inches per annum, running up in some cases near the hills to over 40 inches, and that although this rainfall cannot be deemed excessive yet, considering its amount, it is very evenly distributed on the average over the whole year, consequently resulting in a more or less saturated state of the ground at all times, which tends much to the discharge of heavy rains which may occur at exceptional periods."

The report then estimates the probable monthly rainfall to be dealt with, which are set forth in detail in the appendix. A further calculation by Sir A. Binnie leads up to the greatest diurnal rainfall, and he finds that a drainage area has to be dealt with which may discharge 8 inches in a month, during which period a daily fall of between 2 and 4 inches may occur.

Sir A. Binnie next deals with the flow from the drainage area above Toome, and with the floods of November, 1866, of February, 1877, and of the rainstorm of August 25 and 26, 1905. Coming to the probable discharge to be provided for at Toome, he is of opinion that the lake should be kept at or about a minimum summer level of 46 feet. He then considers in detail the storage capacity of the lake, when raised above its summer level, and concludes that the flood discharge at Toome will vary at from 600,000 up to 800,000 cubic feet per minute.

In considering the causes of the flooding on the shores of Lough Neagh he says that there can be no doubt the primary cause which raises the lake level to 48, 49, and 50 feet above datum, and in the great flood of 1877 to 52 feet above datum, is the want of a free discharge over the nominal 1,200 feet weir at Toome. This has been ascribed as due to the more rapid discharge of rainfall consequent upon improved drainage, and, although he is not at all prepared to deny this, yet there are other causes which in his opinion contribute to produce this effect, and which it is possible to cope with. In previous requirements it has been suggested that to remedy this state of things sluices should be introduced into the weir at Toome, but he is unable fully to understand what useful effect they would produce, seeing that the river at that point and immediately below it is completely gorged in times of flood. The circumstances of the case no doubt have been somewhat modified by the works of the lower Bann navigation, but in all essential particulars Portna is still the place to which we must look for relief if a free discharge of the waters of Lough Neagh at Toome is to be effected.

## The Bann Navigation.

As to the maintenance of the Lower Bann navigation, Sir A. Binnie says: "The general result of a careful study of all the circumstances of the case has forced me reluctantly to the conclusion that if the question of reducing the winter level of Lough Neagh is to be accomplished at any reasonable expenditure it will become necessary to entirely abandon the navigation, and I think that this can be accomplished without materially interfering with the eel fisheries at Toome, Portna, and Movagh, while at the same time improving the river as regards the salmon fisheries by removing those obstructions which to a certain extent prevent the fish passing up the river. I cannot discover that there ever existed any traffic on the Lower Bann navigation which is at all commensurate with the cost of its construction. Putting all matters on one side, and regarding it as a canal for economical traffic, it violates the first principle of canal engineering, for the whole economy of inland navigation is the maintenance of still-water ponds between the different locks, along which navigation can be hauled at a low cost. In the case of the Bann navigation, however, we have a canalised river, down which passes against any upward traffic during the winter months floods at the rate of 400,000 to 800,000 cubic feet per minute. It is therefore not surprising to me that the navigation has not proved a commercial success. No towing path was ever provided, as I presume it was intended that the navigation should be carried on by sailing, polling, or steam power; and I do not contemplate any increase of traffic should a swing bridge, as suggested, be constructed at Coleraire. Nor do I consider, looking at the country generally, it has any chance of improving in the future, seeing that the whole district is well served by railways. They may be said to entirely encircle Lough Neagh, and there are practically two lines of railway down the Lower Bann, bringing the whole district into

railway communication with Larne, Belfast, Newry, Dublin, Coleraine, Londonderry, and Portrush."

#### Toome and Portna.

Dealing with the works required between Toome and Portna, Sir A. Binnie considers that the weir at Toome should be reconstructed at no distant period, whether the navigation be retained or not, and that some authority should be established in the interests of drainage and the preservation of the river channel to prevent the further encroachment on the river by the rather massive cell weirs, as he noticed tentative attempts being made to establish others on the Lower Bann between Breacart Lodge and Lough Beg. He also considers that at Portna the whole of the present weir should be removed, and the rock excavated between its present site and the existing navigable channel. To render, however, the discharge of floods effective the shoals at and about Portlengone should be removed, as has been already suggested by other engineers who have formerly reported on this subject. Works such as the above would, he believed, tend much to the improvement of the surrounding land between Toome and Portna by lowering the general level of the summer water in the river and in Lough Beg, but steps should be taken to prevent the neighbouring, landowners encroaching on what are now the flooded lands, or undoubtedly there would be future claims for further drainage.

Dealing with the Lower Bann between Portna and the Cutts, he says any flooding which takes place between Portna and Movagh is not of a very serious nature, and he does not suggest that the weir at the latter place should be removed, but, owing to the flooding in the neighbourhood of Carnroe, due no doubt to the surcharging of the weir at that place, he suggests that it should be entirely removed.

#### Carnroe and the Cutts.

It is, however, on the nine miles between Carnroe and the Cutts that the principal complaints arise, as the want of free discharge in this portion of the river is due partly to the want of cross sectional area at certain points, as well as to the obstruction caused by the weir at the Cutts itself.

To permit of the full discharge of flood water between Carnroe and the Cutts the cross sectional area of the river would have to be increased at the following points:—

1. Rock excavation in the river bed at the Cutts.
  2. Excavation from the Cutts to the top of the Logan Shoal.
  3. Excavation between the top of Logan Shoal and the railway bridge.
  4. Excavation at the entrance of the Agivey River.
- The above are the same as those proposed by Messrs. Gamble and Dick in their reports.

#### Probable Cost.

In the section of the report dealing with the probable cost Sir A. Binnie writes:—"In contemplating the probable cost of carrying out the above suggestions much will depend on the mode adopted for the execution of the works and the probable time of their commencement and completion.

There are two modes in which the works could be carried out—one by the direct employment of labour, which in a scattered district extending over thirty-two miles would be difficult of administration and inspection, and, I fear, would lead to needless expense, and extend the work over an indefinite period. The other and more preferable mode would be to employ a good contractor, experienced in similar work, which should be carried out expeditiously, and it is upon this latter assumption that I have based my figures.

As I have assumed that the navigation will be abandoned, the most economical mode of procedure, and that which will least, and for the shortest time, interfere with the fisheries, will be by opening or removing all the lock-gates below Toome so as to lower the water-level in the Lower Bann to the greatest possible extent during the summer half of one year. This more particularly applies to the lower part of the Lower Bann between Movagh and the Cutts. Consequently I think that the first work undertaken should be the construction of the two sluices in the lock and at the old mill site at the Cutts, the lowering of the weir and the sills of the Salmon Cribbs and King's Pass, together with the rock and other excavation between the Cutts and Carnroe could then be most economically carried out.

Coincident with this work the weirs at Carnroe and Portna could be removed, so lowering the water between Portna and Toome, and permitting the removal of the Portlengone shoal at the least possible cost. The reconstruction of the weir, etc., at Toome would also be facilitated.

I notice that in looking through the estimate prepared by Mr. Gamble and Mr. Dick that they have fixed on 3s. to 3s. 6d. per cubic yard as the price of rock excavation. This, I feel sure, is too low an estimate in either case, and I have assumed that the cost will be 5s. per cubic yard,

In the same way I notice that the excavation of softer material—earth, gravel, sand, etc.—has been fixed by them at from 1s. to 1s. 6d. per cubic yard. For this class of material I have assumed that it will average about 2s. per cubic yard. The above prices are intended to include any compensation for spoiled banks, etc.

I need not say therefore that in comparing my total estimate with those of former engineers, not only must the difference of the works proposed be taken into account, as they contemplate retention of the navigation, whereas I have assumed its abandonment, but these differences in prices should also be remembered.

As the work may not be immediately carried out, the prices I have allowed and the contingencies of 10 per cent., for which I have provided, should, I think, balance the fluctuations in the cost of materials and labour for the next few years.

Appended to this report will be found the cost of the various works above-mentioned, set out under their various heads, amounting to a total of £76,000.

The actual quantities of excavation have been derived for the most part from previous reports and from the very voluminous cross sections of the river placed before me by the Board of Public Works.

Before, however, any contracts are let it will be necessary that careful working, drawings, plans, and sections, with a detailed specification, should be prepared, so that contractors tendering may have exact and full information of the work to be undertaken before them, and so as to avoid, as far as possible, the introduction into their tenders of speculative prices.

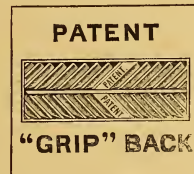
In conclusion, I have to say that, having devoted some months to the careful consideration of this question, I venture to hope that it will be found that I have arrived at the result which will prove a solution of the difficulties placed before me and acceptable, as far as that is possible, to the various important interests concerned.

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the manufacturers of the Patent "Grip" roof tile and lath, the use of which precludes the necessity of nailing, and the employment of this system of roofing combines inexpensiveness with durability. Messrs. Woolliscroft have also carried out some very important and extensive work in red and buff terra cotta, and the exquisite mosaics executed by them on the walls of Armagh Cathedral have been very greatly admired.



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## OUR ILLUSTRATIONS.

**The International Exhibition Buildings.**

Through the courtesy of the *Irish Daily Independent*, we are enabled to present our readers with a view of main buildings of the Exhibition, about which so much controversy has centered. At first there was wide divergence of opinion as to the form and scope of the Exhibition in relation to native Irish products as opposed to foreign exhibits; that point has happily settled itself; later much irritation prevailed regarding the methods adopted by the committee in regard to the design and construction of the buildings; the matter is now, however, finally settled and work begun. Patriotic Irishmen will now, therefore (whatever their previous views may have been), hope that the Exhibition may be an unqualified success from this out, and productive of lasting benefit to the country.

The work of construction has already begun and is being vigorously pushed forward, and our illustration gives a general view of what the building will look like when completed.

The main feature of the Exhibition consists of an octagonal court, 200 feet in diameter, from the centre of which rises a dome to a height of 150 feet and 80 feet in diameter. From off the before-mentioned court are taken four main halls, with connecting corridors to each, and on one side an imposing main entrance with committee rooms, cloak-rooms, etc., the whole giving a floor space just under 100,000 feet superficial. To give one an idea of the magnitude of the structure, the following particulars are interesting:—To obtain the necessary foundations for the structure 5,000 tons of earth will be moved, 2,000 tons of concrete will be used, and in the superstructure about 90,000 cubic feet of timber, 100 tons galvanised sheeting, 30,000 feet of glass, 500 tons plaster, etc.

We understand that the orders for all the materials and sub-contracts mentioned above (excepting the galvanised sheeting) have been, or will be within the next few days, placed with Dublin merchants and contractors, and so far as Irish workmen, with two exceptions, are being employed.

The general contractors are Messrs. Humphreys of London, and the consulting architects to the committee, Messrs. Kaye-Parry and Ross, of Dublin.

**ANSWERS TO CORRESPONDENTS.****Water Supply to Small Country Houses.**

R. RADCLIFFE (Co. Galway) mentions a common case and asks our advice thereon. The house he refers to is situate on elevated ground. The only water supply is from a well at the foot of a hill some distance away, and he needs water on the upper storey to supply a bath and w.c. The cost of a force pump and supply would be excessive, having regard to the size of the house. The cantilever eaves come down too low to permit of catching the roof water on the upper storey. The only plan in our opinion, under these circumstances, is to construct an underground storage tank of concrete and to convey all the rain water of the entire roof thereto, and from thence to pump by means of a small force pump (which can be bought for £5) up to a small supply cistern in the roof. If the tank be made of good size you would in the wet west of Ireland collect enough water to keep the house going. Drinking water would of course still require to be carried by hand from the well. Of course where a ram is practicable it solves the whole difficulty at surprisingly small cost.

Possibly some correspondent may be able to offer a better suggestion.

**IRISH BUILDING STONES.**

It was to limestone, said Professor G. A. S. Cole, F.G.S. when lecturing on Tuesday night before the members of the Architectural Association of Ireland, in the Hall, South Frederick-lane, on "Irish Building Stones," that even the early workers in building material turned. It was to the great Portland stone that they owed the existence of so many fine buildings in Dublin erected in the eighteenth century, which were the glory of the city. It was a splendid stone on account of its uniformity, and for a long time there was no other stone used for such building purposes. By degrees, however, the fine grey Irish limestone began to be developed. He directed attention to the magnificent limestone beds to be found in various parts of Ireland, and stated that there was a great future before most of the quarries which had either been opened or which still await development.

Mr. H. Albery, A.R.I.B.A., presided at the lecture. The Association is at present making a collection of Irish building stones, which should prove very serviceable to architects and their clients.

**COMPLETION OF KANTURK WATERWORKS.**

The Kanturk waterworks scheme, about which so much was heard a few years ago, is now an accomplished fact. The plans of Mr. G. E. Hickson, C.E., Tralee, were pronounced the best by the judge, Mr. Cutler, late City Engineer of Cork, and he was duly awarded the prize of £20. Mr. Hickson's scheme, which has just been completed with such marked success, involved an expenditure of about £5,000. This was also the estimated amount. The installation is the largest in Ireland. The rams, three in number, were guaranteed to have a driving capacity of 42 gallons per minute, the distance of the reservoir being 1,000 yards, and its elevation over the rams 165 feet. The actual tests made within the past week have been most satisfactory, the rams driving over 47 gallons a minute, 75,000 gallons a day, 15,000 gallons over the amount guaranteed. The rising main has a diameter of four inches and the supply six inches, the town and workhouse being, of course, supplied on the gravitation principle. The reservoir, which has been provided with all the latest improvements in filtering beds, has a capacity of 250,000 gallons, which is equivalent to four days' supply for the town and workhouse calculated on a basis of a population of 2,000, the allowance per head of the population being 30 gallons per day, considered by leading authorities a liberal estimate. The water has been turned on for the past ten days, the supply is copious, and everything has been found to work without a hitch. The operations have been under the control of Mr. Hickson, C.E., the resident engineer, during the greater part of the time being Mr. T. J. O'Mara, C.E., at present Assistant County Surveyor for the Nenagh district, North Tipperary. The contractor is a local man of enterprise and energy, Mr. Jeremiah Fitzpatrick. He set to work in last July and completed the entire undertaking in about six months, a unique feat. The work, moreover, has been executed in an enduring manner, which has won for him the highest praise from Mr. Hickson, the Council, the Local Government Board's inspectors, and the general public. Thus for all concerned, and from every point of view, the project may be summed up in two words—success and satisfaction.—*Cork Examiner.*

**BALLYRONEY TO NEWCASTLE RAILWAY.**

On Tuesday last the Chairman and directors of the Great Northern Railway Company entertained a large company at luncheon at the Slieve Donard Hotel, Newcastle, on the occasion of the opening of a new line of railway which has been made jointly by the Great Northern Company and the Belfast and County Down Railway Company, connecting Ballyroney with Newcastle. The extension is thirteen miles in length, and is a single line, of which nine miles have been made by the Great Northern Company, from Ballyroney to Castlewella, and the remaining four by the Belfast and County Down Company, from Castlewella to Newcastle. Over the latter section the Great Northern Company have running powers. The line has been made for both companies by Messrs. Fisher and Lefanu. Considerable engineering difficulties were encountered. The work of construction has occupied about two years, and the cost is about £100,000. Between Ballyroney and Newcastle stations there are stations at Ballyward, Leitrim, and Castlewella. The new line will, it is expected, bring a large tourist traffic, besides opening up for commercial purposes the district through which it passes, and it will also bring Newry, Armagh, Dungannon, Portadown, and Banbridge into closer touch with Newcastle than they were before.

**[Armagh.—ASYLUM BOARD.—APPOINTMENT OF ENGINEER.]**—There were 47 applications for the position of engineer. Robert Cummings, Asylum Cottages, Armagh, was appointed by a large majority.

**Donaghadee.**—The Urban District Council invite tenders from civil engineers to take levels, prepare plans, specifications, and estimates for a proper water and sewerage scheme for the town of Donaghadee. Tenders close on 14th April.

**Gowran.**—It is proposed that a memorial should be erected in Gowran Parish Church to perpetuate the memory of the late incumbent, Rev Canon Hewson, B.A., in the form of a lectern or stone pulpit for the church should the funds permit. The church, which is rich in archæological and ecclesiastical remains, will be greatly improved by some such memorial.

**Thurles.—DISPENSARY DOCTOR'S RESIDENCE.**—The Secretary Board of Works has informed the guardians that the Treasury had sanctioned a loan of £145 for the purpose of building a dispensary residence for Dr. M. Callanan, M.O.H., Thurles.

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## THE WIDNES AND RUNCORN TRANSPORTER-BRIDGE

By Mr. J. J. WEBSTER, M.I.C.E.

At the ordinary meeting on 13th March, 1906, at 8 p.m. Sir Alexander R. Binnie, President, in the chair, the paper, read was "The Widnes and Runcorn Transporter-Bridge," by Mr. J. J. Webster, M.Inst.C.E. The following is an abstract of the paper:—

As the only convenience for vehicular traffic between the Lancashire and Cheshire sides of the River Mersey was by means of the cumbersome ferries at Liverpool, or by the bridge at Warrington, considerable inconvenience was experienced by manufacturers, farmers, and others on both sides of the river; and in 1870 Telford was asked to design a suitable scheme for crossing the river at Runcorn. He proposed a suspension bridge, of 1,000 feet span, having a 30-foot roadway; but the scheme was never carried out. Several other schemes for bridges and tunnels have since been proposed, but in each case the cost has prevented the scheme from being proceeded with.

Application was made to Parliament for powers to construct a transporter-bridge between Widnes and Runcorn, and after much opposition the Act was obtained in July, 1900; a company was formed, strongly supported financially by the Corporations of both Widnes and Runcorn, and the contract for the work was let in November, 1901.

The principle of the transporter-bridge was designed by Mr. Charles Smith, of Hartlepool, who, in 1873, planned one to cross the River Tees at Middlesbrough. This was not constructed, but similar bridges have been erected at Bizerta, Portogalete, Rouen, and Rochefort; and one on this principle is now being erected at Newport, Mon.

The Widnes and Runcorn Bridge crosses the River Mersey and the Manchester Ship Canal with one span of 1,000 feet, and approach viaducts, 35 feet wide, on both sides of the river. The bridge is similar in construction to an ordinary cable stiffened suspension bridge; but instead of the costly high-level approaches, the traffic is carried across by means of a car suspended from a trolley running on the underside of the stiffening-girders, and driven electrically.

The cables are supported by two towers on each side of the river, the towers being square in plan, with braced legs at each corner having a curved profile; the width at the bottom is 35 feet, and at the top 9 feet, the height from high-water line to the centre of the cables being about 175 feet. Each pair of towers is braced together with two double-braced curved girders at the top, and at the level of the top of the stiffening-girder. The towers rest upon four cast-iron cylinders, 9 feet in diameter, which are founded on the rock.

There is one cable from tower to tower, each cable carrying a stiffening-girder, 19 feet deep, hinged at the centre. Each cable has an area of 50 square inches, made up of nineteen strands laid parallel, and clamped together; the steel wires—0.162 inch in diameter—having a breaking strength of 95 tons per square inch. The cables are attached to forged steel cross-heads, to which are coupled the steel links taken down to anchor plates in pits excavated in the rock and filled in with concrete.

The suspenders from the cables to the stiffening-girders are steel wire ropes  $\frac{1}{4}$  inch in diameter, spaced 18 feet apart, and are coupled to bridges attached to the cast-iron clips of the cables. The cables are coated with a bituminous compound, and wrapped with two layers of strong sailcloth saturated with the same solution. A number of experiments were made with different forms of steel ropes and connections, details of which are given in the paper. Some interesting experiments were also made with steel pins, the results of which show that in designing pins for bridgework, although they would fail by shear, they should be designed to withstand the bending-moments.

The car-trolley, which runs on rails on the bottom flange of the stiffening-girder, is 70 feet long, articulated in five sections, and 4 feet 10 inches deep; there are bogie wheels on each side 18 inches in diameter. The motive power consists of two electric motors of 36 B.H.P., each driving, through gearing, one pair of wheels. The trolley is fitted with electric and hand brakes, the whole of the machinery being under the control of the man in the cabin at the top of the car. The car is 55 feet long and 24 feet wide, and travels at a speed of 7 miles per hour.

The generating machinery is contained in a building at the bottom of one of the Widnes towers, and consists of two gas engines of 75 h.p. each (one being spare), two dynamos of 48 kilowatts capacity (one being spare), one

booster, and an accumulator with a battery of 245 cells. The machinery supplies the necessary current for driving the car and illuminating the structure, and was designed in consultation with Dr. Edward Hopkinson.

The total cost of the structure, including the cost of obtaining the Act, was about £130,000.

The engineers for the work were the author and Mr. John T. Wood, M.Inst.C.E., the Resident Engineer being Mr. L. H. Chase, M.Inst.C.E. The contractors for the masonry, etc., were Messrs. W. Thornton and Sons, Liverpool; the contractors for the superstructure were Messrs. Arrol's Bridge and Roof Company, the cables being constructed and erected by the St. Helens Cable Company. The electric machinery was constructed and erected by Messrs. Mather and Platt, of Manchester.

## THE ROYAL HIBERNIAN ACADEMY EXHIBITION.

The Architectural Section at the R.H.A. this year is one of the largest and most interesting that has been seen there for some time, and, taken as a whole, it is perhaps the best.

The exhibits number in all twenty, fourteen of which are the work of Irish architects, the remaining six being English, and all illustrative of the work of one eminent architect, Mr. Arnold B. Mitchell, the number and beauty of his drawings claiming first mention.

No. 271 is a beautifully handled water-colour of Maesrugian Manor, Caermarthenshire, and No. 276 a drawing in brown ink of the same house, treated in the architect's characteristic manner, are particularly striking and well worthy of study.

No. 272, a house at Great Stanmore, Middlesex, is another water-colour from the brush of Mr. T. Frank Green, and has been illustrated along with the above in the professional journals.

This design is remarkable for the beautiful general grouping and the clever handling of the large chimney stack and stone bays, the general treatment being in rough cast and tiles.

No. 275, a large perspective in pencil of the Royal Villa and Golf Pavilion at Lecoq-sur-Mer, has been illustrated, and is one of the finest pencil perspectives which we have seen, and is one from which a student would derive much benefit if carefully studied.

Nos. 306 and 317 are water-colour perspectives treated in a fresh way of a mansion at Barnett Hill, Guildford, and stabling at the same place. The house is Georgian, treated in an original manner, the plan of the house being long, with projecting wings at each end of the front, in each gable of which there is a massive chimney stack cleverly treated.

The stables illustrated in the second perspective are also very cleverly treated, and the massive chimney stacks to the coaching houses are an echo of those in the main house, and give an air of distinction to a very picturesque design.

Messrs. Doolin, Butler, and Donnelly are represented by two drawings, Nos. 267 and 270, the first of the proposed High Altar at Kilarc, County Donegal, a fine design, and the second a High Altar and Reredos in new church at Claremorris, an elaborate Gothic design.

No. 300, proposed Town Hall for Tralee, by Messrs. R. M. Butler and G. A. E. Hickson, is a vigorous pen and ink perspective of a very pleasing Renaissance design freely treated, which well deserved the place it was awarded in the recent competition.

Mr. W. A. Scott sends six exhibits all in pen and ink, Nos. 297 and 302 being of a house at Chipstead, Surrey, treated in brick, rough cast, and tiles of pleasing proportions and grouping.

No. 269, the new Foresters' Hall, Enniskillen, is a simply treated and effectively grouped design in brick.

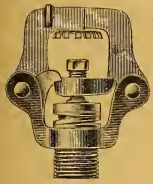
Nos. 274, 298, 299 are all of a New Convent Chapel, Enniskillen, simply treated in brick and stone, the chapel being placed over cloistering. This arrangement probably suggested by the site, which is much higher at one side than the other. There is also an interior of the chapel very simply treated, Celtic in feeling.

Mr. R. C. Orpen sends one drawing, No. 268, executed in line in his own characteristic manner.

Mr. James H. Webb sends two exhibits, one a photograph of business premises at Foxrock, and another, No. 301, in pen and ink of a house at Dalkey treated in a sunny manner.

We would heartily recommend all students and architects to inspect this exhibition. They will not be disappointed.

H. G. LEASK.



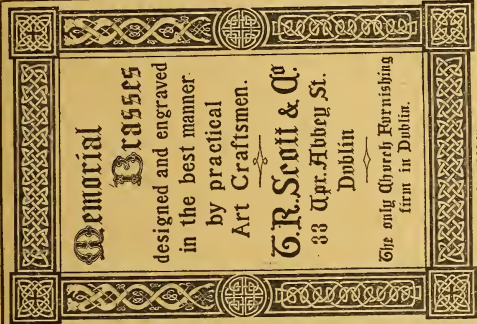
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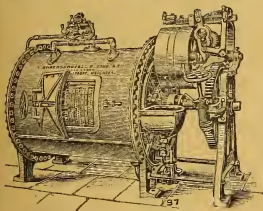
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## ARCHITECTURAL EDUCATION IN IRELAND.

We have been in a bad way, in a better way, let us now contrive the best way, may well be taken as the keynote of Mr. Gilliland's address on the all-important subject of their professional education to the members of the Architectural Association of Ireland. We print the substance of the paper elsewhere in the hope that energy may be kindled where so much apathy exists. It is unfortunately too true that the subject is one which scarcely appeals to the present-day Irish architect. The pupil naturally fails to realise that sound training is the very essential of success; without it the pittance and the drudgery of an assistant's life await him. The architect in substantial practice seems either unwilling or unable to give attention to the matter at all. What is the result? It is, we regret to say, only too apparent. In the cities there is a lamentable scarcity of work, and what is executed is often of a mediocre description; in the provinces the name of architect is but little appreciated—his identity is merged in that of the engineer. The status of the profession has been almost lost sight of; indeed, architecture is now scarcely considered to be a profession at all, and certainly not to be mentioned in connection with those of law and medicine. In the columns of the press and in daily experience it is seen that at one end of the scale architects are being crowded out by those who are unqualified for their work—men

without elementary training who, with a more or less superficial knowledge of building, pose and posture as architects before an unenlightened public and its representatives. At the other end competition is experienced from highly-trained architects from England and Scotland, men who have had facilities of which they have fully availed themselves for attending the various art and technical schools and centres with which they were surrounded—men who by their opportunities can look on architecture as a real and living profession, not solely as a means of bread and butter earning. In such stress what chance has the average Irish architect, handicapped at the start through lack of training, and henceforth weighted down with the necessity of acquiring the knowledge that should have been his in the years when the faculty of learning was at its zenith? It is easy to sit down and rail at the Government for its lack of discernment, and to criticise the action of fellow-countrymen in employing "foreign" architects or hedge carpenters when there is so much talent in their land waiting for employment. It is not easy, but it would be more to the point if the primary cause were sought for and combated, and the search would not be prolonged. It is an unfortunate fact that affairs architectural are in the hands of a body whose powers of discernment of the broader necessities of the profession have become atrophied through disuse. For years there was no architectural education at all in Ireland except that to be gleaned in an architect's office. This loss is now making itself felt, so much so, indeed, that those architects, who are at the very commencement of their careers, and whose every moment should be spent in pursuing their own course to success, have concluded that these things must no longer be, and that if the profession is not to become practically extinct in Ireland, some system of education must be devised to at least approach the high standard of training which exists elsewhere. The result of this movement is the Architectural Association of Ireland, which for ten years has made its way steadily towards this goal. Individual assistance has been rendered by a few of the senior members of the profession, and with splendid results, which only makes the inactivity of the majority the more deplorable. They live

"In lazy apathy, their virtue fixed,

Contracted all, retiring to the breast;

But strength of mind is exercise, not rest."

Content to look on the efforts of the younger brethren with a tolerant eye, oblivious of the many evils by which they are beset, and totally ignoring the fact that it will soon be too late to cope with the competition that is steadily encroaching on the profession from all sides, they are fast losing the sympathy of their most loyal supporters. Quite recently the sister Institution of Civil Engineers of Ireland at one bound raised the status of the engineering profession in this country by initiating an examination scheme, and so adding to the difficulties attendant on admission to that body. The Royal Institute of Irish Architects some few months ago were urged most strongly to adopt a similar measure, but the opportunity was played with and lost, and its full meaning is by no means realised as yet. With the spirit of inertia dominant amongst those who should lead, and whose influence means so much were it rightly exerted, it is decidedly refreshing to have the energetic views of the ex-President of the Ulster Society so vigorously placed before the profession. Whether University education is the best solution of the problem is open to argument, and there may be divergent views upon the

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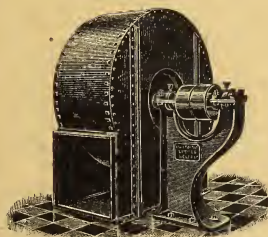
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desirability of the purely architectural school which the Irish Association is now endeavouring to found. But to those outside the charmed circle of the Institute Council there is a consensus of opinion that something must be accomplished, and at once, to deal with the needs of the profession in Ireland on a broad basis, to raise it to its proper plane in the public estimation, to give the junior ranks the encouragement which is their due, and to safeguard their interests as far as possible in the present stress of competition. Mr. Gilliland in another connection used the thrice-repeated word "Compel." By registration and examination a student may be compelled to study his profession before he is admitted to its ranks, and the stimulus at present lacking is supplied. Architects are now demanding that the Council of the Irish Institute should bestir itself in these and other matters, and they have right on their side. They have also, fortunately, the big battalions.

## COMMENTS.

### The Institution of Civil Engineers and the Lord Lieutenant.

On Tuesday last the deputation from the Council of the Institution waited upon His Excellency and presented him with an illuminated address of welcome. Lord Aberdeen, in the course of his reply, said that—It is no wonder that engineers are proud of their profession, with its imposing achievements, its absorbing interest, and its almost boundless opportunities. We who live in Dublin are constantly reminded of what we owe to the Engineer as well as his near kinsman the architect. I am thinking for the moment especially of the bridges, many of which, because of their beauty of design and workmanship, are an adornment to the city, and which also therefore are not only a source of practical utility, but of delight to the eye. But the very mention of bridge design and bridge building, of course, opens up a far-reaching theme, and a very fascinating one of almost limitless extent. I wish, therefore, to check my response to your address, and only add that I am looking forward with very much pleasure to accepting the hospitality which you have already proffered, and I am glad that the space of time to be bridged over before that occasion arrives is a comparatively brief span. The festive occasion alluded to by His Excellency is, we understand, the annual dinner which is to be revived this month, after a lapse of three or four years.

### The Royal Hibernian Academy Exhibition.

The annual Exhibition of the Royal Hibernian Academy was opened on Monday last by the Lord Lieutenant. The attendance was not large, and the general level of excellence cannot be said to be much higher than in former years. In the larger and more ambitious works the standard is not high—relatively as a school of painting Ireland stood far higher fifty or sixty years ago when compared with England than she does to-day. No one can deny that Art in England has progressed by leaps and bounds. The English school of painting now occupies a most respectable position in Europe, while in her own special domain of water colour she is not excelled. Above all sculpture has, mainly through French influence originally, become a real living art in England, which heretofore was innocent of sculptors. Scotland has a splendid and healthy school of its own, numbering many artists of the highest ability, while in architecture she can safely challenge comparison with the best work London can produce. How different, alas! is the story of Ireland. In art she

has steadily deteriorated, and public taste in pictures, sculpture, and architecture could not well be lower than it is. Take the public memorials erected in the provinces during the past twenty years, for instance. We hope a great deal from the work of the recent Royal Commission, which has formulated its report, and which is of a very satisfactory character. The wonder is that we have any remnant of a school of art at all under the present condition of chaos that prevails. The Hibernian Academy has during all these years done its duty as well as it could in its crippled state and kept the art of painting alive in Ireland; but "bricks cannot be made without straw," and to maintain a teaching school in connection with the Academy means money. The result of the starvation policy of successive Governments has been to almost kill the school maintained by the Academy. A properly equipped school, adequately paid teachers, and models of the life are first essentials, together with an annual travelling scholarship. We trust we are not over-sanguine in looking forward to the fulfilment of these hopes. In the present Exhibition the landscape school completely maintains its reputation, and the work of its exponents like Mr. Alex. Williams, Mr. J. M. Kavanagh, and a number of others, may be described as the salt of the Exhibition.

The architectural room is even scantier in contributions than usual; elsewhere we publish a detailed appreciation from our correspondent, Mr. H. J. Leask, while he properly gives pride of place to the English work, and we quite endorse the policy of the Council in securing such to eke out the paucity of the contributions to this Irish Exhibition; still we cannot help deploring the necessity. It seems a pity so few Irish architects make or exhibit perspectives of their work. Year by year they grow less. Possibly, as Mr. Leask suggests, the contemplation of these fine examples of English work may inspire our budding Irish architects with the fiery zeal of emulation.

Later we hope to publish a fuller criticism of the paintings and sculpture.

### Castlewellan Granite.

We are often told, and often believe, and indeed with some degree of truth, that nothing seems to be done right in this unfortunate country, and we are further told that we are behind England and Scotland in every particular. But occasionally we do manage to hold our own, as several world-renowned industries demonstrate. We hope that before many years have passed the granite industries will be one of the most flourishing. That the granite is there and is "right," there can be no doubt. The other day the "Scotsman" told its readers that—

"The Rubislaw Quarries at Aberdeen have furnished a piece of granite for the base of a monument which measures 11 feet 10 inches high, 10 feet 3 inches in length, and 2 feet 8 inches in thickness. It weighs 24 tons, and is said to be the largest flawless stone ever taken from a Scotch quarry."

Last month, at the Castlewellan Granite Quarries, with a shot of powder, there was raised clean out of its bed a granite block measuring 9 feet by 9 feet by 3 feet, or close on 250 cubic feet, and weighing upwards of twenty tons. This, moreover, is a clean, square stone of beautiful blue colour. We do not know if there be any record of heavier blocks being removed 18 feet from the bed by a shot. More recently, however, Messrs. McCartan, the owners of the quarry, have beaten this record of theirs, for within the present month they have taken out a great stone—probably the record this time. It measures 10 feet by 8 feet by 7 feet, or 560 cubic feet, and weighs close on 50 tons. Both these fine stones are still on Messrs. McCartan's hands. Messrs. McCartan certainly deserve the greatest credit for

their enterprise in pushing this industry so vigorously; they assure us, too, most positively that they leave nothing undone to keep faith in regard to orders—in fact, that Dublin builders may rely upon being well looked after.

#### Building in the West of Ireland.

Several works of some importance are finished recently or nearing completion in the West of Ireland. Large new churches are in course of construction at Claremorris and Ballyhaunis, the former being roofed. At Castlebar a new post office and a house for Dr. Knott are finished. At the Asylum in the same place over £30,000 has been expended, Messrs. Ryan, of Limerick, being the contractors. At Breaphy, near Castlebar, a very big contract has just been completed by Mr. White, an English contractor. Mr. R. C. Orpen has added to Castle Maggaret, near Claremorris, the seat of the Earl of Oranmore, who has expended some £25,000 on this work. At Mulranny, on the Atlantic Coast, a church and parochial house have been erected; at Ballinlough a parochial house. This house, together with one at Colooney and a house being covered with red tiles—rather an innovation in the west—are all within the County of Mayo. In the neighbouring western counties work has been scarcer, and very few new works are further projected at present in any part of the west. In fact, in common with the rest of Ireland, building prospects in the west look remarkably black.

#### Power Gas Plants.

The Engineering and Scientific Association announce a paper for next Monday, 26th inst., on the very interesting subject of "Power Gas Plants: their present application and future possibilities, with special reference to Ireland." The lecturer will be Mr. Thomas Rigby, A.M.I.M.E., of Messrs. Crossley Brothers. It is hardly well known enough what great things a gas producer plant can do and the economies that may be effected in providing power for producing electric light or power. The paper should be a thoroughly instructive one, Messrs. Crossley being so well known as amongst the first makers of such plants.

#### ACTION AGAINST AN ARCHITECT.

At the Westminster County Court, before Judge Woodfall, an action for negligence was brought by Mrs. Edwards, late of Craven-street, Strand, against George Thrale Fell, architect, 11 Leinster-gardens, Lancaster-gate, W., claiming £50 damages for not obtaining compensation for loss of light and air, and for extra noise to premises. Mr. E. T. Sandars appeared for the plaintiff, and Mr. Stephen Lynch for defendant. Plaintiff, Mrs. Ada Isabella Edwards, said that in 1904 she had a lease of 14 Craven-street, Charing-cross, and finding building operations going on at the Northumberland Arms Hotel at the rear of her premises, she called in defendant in December, 1904, to advise her as to the possible injury to light and air. Defendant wrote to Mr. Douglas Scott, architect to the proprietors of the hotel, and informed her that the injury to her light would be slight, and eventually settled the matter in January, 1905, for ten guineas. She had given defendant no authority to bargain on her behalf. Cross-examined: Defendant told witness he was in constant communication with Mr. Scott. Defendant showed witness a plan, and told witness, owing to a recent decision in the House of Lords, she had no case, but he would see the proprietors of the hotel about it; but witness could show that there was a great injury to her light, owing to the raising of the wall of the hotel. Witness objected that defendant had no power to act on her behalf. After seeing her solicitors she wrote personally to Mr. Scott, asking £100 compensation. She called on Mr. Scott, who showed her the plans, and ridiculed the claim.

Mr. Lynch, for defendant, said that defendant pointed out

to plaintiff that in consequence of the decision of the House of Lords in *Colls v. Home and Colonial Stores*, the law as to ancient lights had been considerably modified, and she therefore had no case in law for such small diminution of light as that she had sustained. He had therefore shown no negligence or want of skill. Defendant was called, and said he prepared plans and sections of the two premises for plaintiff, showing the alterations, which carried the wall to the height of the former roof ridge, and advised her that she had no case at law, but offered to write to the owners of the hotel, and do what he could for her. This he did, and eventually, at an interview, witness suggested without prejudice ten guineas in satisfaction of all claims. Cross-examined: Witness had for years been, and is at the present time, chief assistant to Mr. William Woodward, F.R.I.B.A., but was not himself a Fellow of the Institute. Witness suggested to Mr. Scott the ten guineas verbally and without prejudice, and the plaintiff was not, in witness's opinion, bound to accept the proposal. Defendant pointed out to his Honour variations between the plans put in by the plaintiff and those he had prepared, and contended that the former were inaccurate.

His Honour, in giving judgment, said that he had come to the conclusion that the plaintiff had entirely failed to substantiate her claim against the defendant, or to prove any negligence on his part. Defendant had acted in the most honourable manner towards his client. If plaintiff could have shown that she had sustained damage by acting upon his advice, it would have been a reflection on defendant's want of skill; but this was not the case, and he had been impressed by the skilful manner in which defendant gave his evidence and established the accuracy of his plans. Judgment would, therefore, be entered for the defendant.—*The Architects' Magazine.*

#### EXCAVATION.

In many cases no difficulty occurs in detaching the material from its natural bed; in others considerable trouble is experienced, and adequate knowledge of the most economical methods becomes specially desirable. We may add that in either event the architect ought to make himself acquainted with the nature of the strata immediately below the surface. This is necessary so that he may adequately protect the interests of his clients, for contractors occasionally profit by free acquisition of most valuable building material in a totally unexpected manner. As an illustration of this we may mention that in connection with a city improvement scheme of some magnitude in the North of England the contractors, who were also builders, obtained a gratuitous supply of building stone which resulted in a net gain to them of several thousand pounds, and conversely an equivalent loss to the proprietors. Similarly, the contractor ought, if possible, to obtain some information as to what there is below the surface, or it may be his turn to suffer. An example of the kind was furnished during the building of a public institution in the city to which reference has been made, where the contractors who had tendered on the assumption that the subsoil would be easy to deal with were put to considerable unforeseen expense in breaking up and removing a portion of the foundations of an ancient and most substantially-built city wall. We have reason to know that the firm in question considered that the knowledge gained concerning the cohesion of early masonry was somewhat dearly purchased. On large engineering works, involving the excavation of earth and rock in huge quantities, it is still more important that the engineer and the contractor should ascertain, as far as possible, the character of the material to be dealt with. At the same time most careful estimates have to be made of the quantities, although it must be pointed out that there is no absolutely accurate method of calculating earthwork. In many situations little difficulty is experienced in forming a reliable opinion as to the nature of the strata underlying the surface; in other places trial borings may be necessary, and the results, considered in connection with local geological data, enable the engineer to obtain a very good notion of the prevailing conditions.—*The Builder.*



## CORRESPONDENCE.

## ARCHITECTS' CHARGES.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—Touching the recent letter from Mr. R. C. Orpen in the last issue of the IRISH BUILDER, I had a very interesting conversation with a young acquaintance of mine last night on a somewhat similar subject to that which Mr. Orpen said "drove clients away from our doors" (the inaccuracy of architects' approximate estimates), viz., "architects' charges." My friend owned some land near Dublin, and embarked on speculative building in order to utilise it. Being a professional man himself he went to an architect of standing in the profession. He freely paid him 5 per cent. on all the work, although it was nearly all repetition (several terraces of £50 a year houses), and although he said to me (to use his own words) "that there is no profession in which there is so much under-cutting as in yours. I like to get a fee myself when I earn it," he said, "and although I thought 5 per cent. stiff, I made no objection, and paid my architect over £200 a year, for three or four years."

"I subsequently divided the land into little rectangular plots for building sites and let them; my architect put a little map on the lease and counterpart and charged me £4 4s. therefor, which I said was excessive, and offered 2 guineas, which was refused. The builders who rented the plots from me refused to pay more than £1 1s. I actually paid £3 3s., and so on every plot I let I lost £2 2s!" I could make the map myself, he said. Later, when these houses came to be built, I asked him to see they had been properly built; he visited several within an hour. He charged me £1 1s. per house per visit. Next, the same architect made plans for some new roads, the lowest tender for which came to about £3,000, and was never gone on with. I paid 2½ per cent. thereon. I have come to the conclusion that architects are a humbug. I have since done a fair amount of building, but I have been my own architect and have lost nothing thereby. The lease maps I can get done for 5s. each. The levels of the roads were all wrong; two feet out in a short distance!" Now, I have experienced some similar cases myself. I know that in places where I have been building people have told me they dreaded employing a Dublin architect for trifling jobs on account of high charges and big travelling expenses. Personally I was never yet once offered less than 5 per cent. on a building work, i.e., for designing and supervising a new building or additions to an old. I think that for some incidentals—trifling advice, lease maps, road work, small surveys, etc.—some architects must charge stiffly. I have no personal knowledge nor have any authentic cases, save the one I mention come under my notice. But I do know that there is a widespread dread of Dublin architects amongst plain country people; for instance, a country shopkeeper, as a rule, would no more think of employing an architect than of flying, even for fairly substantial jobs. Either the builder or some local self-styled "C.E." does the necessary, the latter's fee being a mere trifle.

I wonder is it the case that any legitimate business is lost to architects through excessive charges? It would be interesting to know. Possibly some of your other readers have had experience of this matter.—Yours, etc.,

"A DUBLIN ARCHITECT."

## CONDITIONS OF CONTRACT.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—I have read with much interest Mr. James Beckett's able letter dealing with this controversial matter. As you say, both as coming from an old and experienced builder, and as the President of the Master Builders' Association, his observations are entitled to receive the most serious attention of your readers. Mr. Beckett has not, however, to my mind, put forward a single argument that would tend to show that builders suffer any real hardship by reason of the architect being master. I am quite with you and with Mr. Beckett in your common regret that the new conditions of contract are to be so lengthy. The old ones were bad enough—the new are worse. I gave up using the old ones some time ago, and I shall certainly not adopt the new ones unless I am forced to. The arbitration clause is a patent humbug. It affords no real protection to the builder, and is a nuisance and source of expense to the client, and no less an authority than the Lord Chief Baron denounced the other day, in all its moods and tenses, the practice of arbitration. If the architect is dishonest he can rob the

builder, arbitration clause or no arbitration clause. If he is incompetent, articles of agreement won't educate him, when articles of indentures have failed to do so. While, if he goes mad trying to understand and master the new conditions, not one of the clauses offers a panacea for making him sane again. No, sir, a builder will never have comfort so long as he is dealing with a dishonest or incompetent architect, and no form of contract will make such men either honest or clever.

But, after all, how many dishonest architects are there in Dublin, willing to deliberately wrong a builder. While, as to their competence—they may not be all Michael Angelos in design or past-masters of construction—but how often do they make so serious a mistake as to cause a builder any greater loss than the stoppage of say, brickwork for half a day or so, while an overlooked steel joist or the like is provided. I think, too, that such cases of seriously defective drawings being given to surveyors, as you instanced, are mostly mythical, and I think you have only needlessly alarmed the contractors.

The whole question boils down to this: The architect is the designer and must have absolute control in seeing his own design carried out; if you deprive him of that control you undermine his authority, and leave him and his client at the mercy of an unscrupulous builder, who, of course, has far more temptation to be dishonest than the architect, though it is to their credit that so few builders are anything else than honest and upright. The only practical alternative is to go back to something approaching the practice of the middle ages, with the master craftsman as the guiding and directing mind. How far such a radical change would fall in with our complex modern conditions I cannot say. Of course there is the further solution, to quietly permit the functions of both architect and contractor gradually to pass into the hands of the monster emporiums, such as Waring's and Gillow's, who keep a staff of tame architects on the premises; and, indeed, it cannot be gainsaid their work, both in design and construction, is at least equal to the average. I am told that, moreover, two or three of our big Dublin firms have followed suit, and either keep a tame architect on the premises, or else retain one who "devils" for them; the latter may be described as being in a state of semi-domestication, like the zebra.

There are further clauses in the old conditions of contract and retained in the new that are nothing less than a humbug: for instance, the clause relating to a builder being required within 21 days to set forth in writing his objections to the surveyor's return of extras and omissions, failing which the architect may arbitrarily issue his final certificate. Suppose he does, what follows? The builder may, if he likes, take it and pocket his money; so far, so good; but if he doesn't like to, he needn't! He can apply to the courts to make the arbitration clause a rule of court, and the court will do so as a matter of course on an *ex parte* motion. Surely this, at least, shows the builder has privileges under the contract, privileges, too, that it was never intended he should have. True, his order of the court does not bring him much further, but in nine cases out of ten, he can, by this means, "bluff" the architect into giving him the arbitration he had previously refused, and if he be a clever man may succeed in getting a further submission to arbitration signed, into which a skilful lawyer may import words widening the scope of the arbitration into a general inquiry; then you have the delightful spectacle of the umpire and two arbitrators, with an array of counsel sitting for days, at enormous expense, and find at the end that their decision may be upset because of some trifling legal informality.

Pardon this digression, but I only mention these facts to show how much the conditions of contract need to make them practical, legal, and, above all, short and clear.

I quite agree with Mr. Beckett that the builders should be consulted in the drawing up of the standard conditions.—Yours, etc.,

"POTBOILER."

## EXETER CATHEDRAL

TO THE EDITOR IRISH BUILDER AND ENGINEER.

SIR,—My attention has been called to your notice of my remarks on above at the meeting of the A.A. by a reference to the lecture in the *Exeter Flying Post*, where the writer, naturally, expresses surprise that the Norman towers are not referred to only a "Norman tower." He will be pleased to know that the towers were shown on the screen and described. No one but a printer, or proof reader, would have the courage to attempt to rob Exeter of the glory of one of its fine old towers.

The other misprints were not so serious.—Yours,  
P. J. LYNCH.

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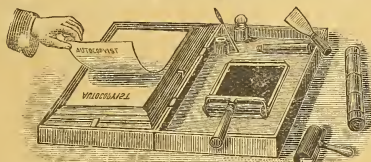
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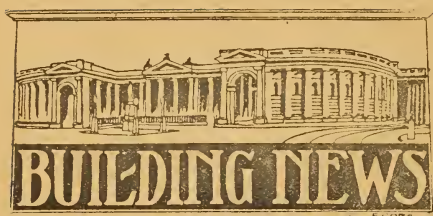
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**Belfast.**—Messrs. Blackwood & Jury, Architects, 41 Donegal-place, Belfast, are preparing plans at present for a large block of shops and offices to be built for a private company at the corner of Arthur-square, Arthur street and William-street South. This will be a great improvement to this locality, especially as it will be a very handsome and important building. They are also preparing plans for new school buildings for the 'Ladies' Lancasterian Industrial School.'

**Cookstown.**—IMPROVEMENTS IN COOKSTOWN.—Mr. H. W. M'Adoo has erected a house in William-street, Cookstown. The whole frontage is 44 feet, and the shop occupies the upper half next Messrs. D. Anderson and Son's premises. The plate-glass windows are of the usual character, except that they are exceptionally large, and the woodwork is reduced to the minimum, and the ceiling is lofty. The shop is fitted up in the best style, with mahogany counters and ample shelving accommodation. It runs back for 77 feet, the full width of the front. The back portion is lit chiefly from above, a lantern of rolled glass being inserted in the vulcanite roof on the back of the shop. At the rear is also a side light and a door to the yard, and from this access is had to the workrooms upstairs, which, again, are lighted by a lantern roof. The entire arrangement of this part of the building will give accommodation which is spacious and at the same time convenient and compact. The remainder of the building will be used as a private residence, with a front door and dining-room, having bay window looking on the street. Beams have been inserted here, so that at any time, if thought desirable, the room and hall can be converted into another independent shop at the minimum expense and without structural alterations. The new building forms a conspicuous feature of the street, and with dormer windows on the third floor, presents an imposing appearance.

The architect, from whose plans the work was executed, was Mr. J. A. Hanna, Belfast, and Mr. Hugh Thompson was the contractor.

**Dublin.**—At a recent meeting of the Pembroke Urban Council plans of a number of new buildings were approved on the report of the Council's Surveyor that the by-laws were complied with. The Local Government Board wrote suggesting certain alterations in the plans of the proposed additional artisans' dwellings at Donybrook, and it was ordered that the necessary amendments be made, and tenders be invited when the plans are approved. Plans were submitted as lodged by the International Exhibition (Incorporated) of the central feature of the Exhibition buildings, and were approved; also plans of contractors' office buildings, subject to the proposed plans being found satisfactory. The draft contract for fencing Ringsend Park, as prepared by the Council's law agents, was submitted and noted. Messrs. Tomlinson and Mills wrote that they were prepared to send in designs of a cheap class of cottages for the working classes, and mentioning £60 as the estimated cost of each cottage.

**THE ROYAL COLLEGE OF SCIENCE.**—The Board of Works announce in our advertising columns to-day that builders desirous of tendering for the retaining walls, vaults, foundations and walls, etc., up to the ground floor level for the proposed new building about to be erected in Upper Merrion-street, Dublin, can obtain, on and after the 15th March, 1906, the bills of quantities and form of tender prepared for the purpose, on application to the Secretary, Upper Merrion-street, Dublin.

Messrs. Aiden Grennell and Company's premises in Camden-street, destroyed by fire, are shortly to be rebuilt, under the supervision of Mr. A. E. Murray, architect, Dawson-street.

**Enniscorthy.**—THE NEW POST OFFICE.—Though not imposing from an external point of view, the new Post Office on the South Parade in Gorey is indeed a very fine building, and provides an accommodation for which a want was long felt. It is a brick-fronted construction, with arched windows of a neat design, and including out-offices, occupies a ground space of 96 ft. by 46 ft. The sorting-room is one of the finest to be seen, measuring 41 ft. by 24, whilst the public office covers 20 ft. by 18 ft., having on one side a spacious entrance 11 ft. 6 ins. by 8 ft., and on the other the postmaster's office, 14 ft. by 9 ft. 4 ins.

There is a special room of fine dimensions for the telegraph boys, in which they receive their messages from a hatch, without communication with any other portion of the building. Accommodation in the telephone room, which measures 8 ft. by 5 ft. 4 ins., is all that could be desired, and the battery room leaves nothing wanting in this respect either, occupying a space of 9 ft. 6 ins. by 10 ft. There is a store room provided, the dimensions of which are 8 ft. by 10 ft. The ceiling in the several departments is of panelled pitch pine. Humphrey's patent gas lights, which throw forth a brilliancy that can rarely be surpassed, go to perfect the night lighting arrangements. In the day the large sorting-room is lighted from the roof by wired glass, which is of modern invention and a novelty in this locality. The foundation of the structure is concrete from front to back, as also are the walls, whilst the floors of the public office and the porch are set in patent tiles. The heating and sanitary arrangements are perfect. All who have been through the office speak of it in terms of the highest admiration. It is a credit to the workmanship and skill of the contractor, Mr. B. W. Webster, Gorey, who also drew up the plans for the structure. The contract was begun on the 12th January, 1905, and exactly on that day twelve months it was completed. Business was opened by the postal authorities on March 1st. Mr. Isaac Hutchinson, postmaster, Gorey, is responsible for the erection of the office, which he has now let on lease to the Postmaster-General.—*Enniscorthy Guardian*, March 16, 1906.

**Kilkenny.**—Estimates are required before the 25th inst. for carrying out important alterations to Clough Church, Co. Kilkenny, for the Rev. John Roe, P.P. The plans and specification relating thereto can be seen at the Presbytery, Clough, Castlecomer, or at the offices of Mr. William H. Byrne and Son, architects, 20 Suffolk-street, Dublin.

**Lisdoonan.**—Mr. John M'Groder received tenders for building residence and outoffices at Lisdoonan, near Carriekmacross.

**Mayo.**—Mr. R. E. Mellon, Building Contractor, Brighton Building and Engineering Works, Rathgar, is at present carrying out several alterations and a complete new system of plumbing and drainage with septic tanks, etc., at Asleigh House, Co. Mayo, for the Earl of Altamont, and also some important alterations and improvements at Westport Castle for the Marquis of Sligo. Messrs. Kaye-Parry and Ross, architects, engineers.

**New Ross.**—Tenders are invited for a new parochial house at New Ross. The architects are Messrs. Doolin, Butler and Donnelly, of Dublin, and the tenders must be delivered by Monday next.

**Naas.**—The tender of Mr. R. E. Mellon, Contractor, Brighton Building and Engineering Works, Rathgar, has been accepted by Colonel Wogan Browne, for the building of his new residence, Oldtown, Naas, Co. Kildare. The Architect is Mr. R. Caulfield Orpen, South Frederick Street, Dublin.

Committee of Kildare Club have received tenders for the erection of Cricket Pavilion at Naas, according to plans and specifications prepared by Mr. J. J. Inglis, C.E., 18 Nassau-street, Dublin.

**Omagh.**—Tenders were received for alterations to premises, 8 Market-street, Omagh, for Miss M'Geown, according to plans and specification of Mr. J. P. M'Grath, architect, Commercial Buildings, Londonderry.

**Scarva.**—NEW ORANGE HALL.—The members of the Orange Institution having secured an excellent site free of charge in the lower part of the village from Mr. Samuel Greer, of Glasgow, have arranged to lay the foundation-stone of the new hall on Easter Mouday next. Mr. Henry Hobart, Dromore, is the architect of the building, which is likely to be an ornament to Scarva.

**Strabane.**—The County Committee of Technical Education have decided upon expending £1,500 on a technical school on a fine suitable site in the flax market. The drawings and specifications have been prepared by Mr. Stewart, Borough Surveyor.

#### PHOTO-PRINTS BY ELECTRIC LIGHT.

Architects and Engineers who want good copies, quickly done, should send a post card to J. Lindsay, 17 Westland row, Dublin, or Telephone 2278. City orders called for. Prompt attention to country orders. Tracings neatly made. Photo-papers stocked.

# ENGINEERING SECTION.

## ITEMS.

We congratulate Mr. Henry Hawkins on his appointment to the post of gas engineer for the City of Limerick at a salary of £300 a year. Mr. Hawkins' experience was gained at Heywood Gas Works and at Todmorden. There were 68 applicants for the post.

The members of the Junior Institution of Engineers recently paid a most interesting visit to the home of electrical standards at the Laboratory, Whitehall. Mr. A. P. Trotter, the electrical advisor to the Board of Trade, was unfortunately, through indisposition, unable to attend. Amongst the exhibits were the standard ampere balance and the 100-volt voltmeter, the former measuring to 65 parts in a million, and the latter to 84 parts in a million. The apparatus installed enables currents up to 10,000 amperes to be measured, and the voltmeters will record a 12,000 volt current. In a small room, where a constant pressure is maintained by automatic means, the standard ohm and other important resistance coils were shown, and the process demonstrated whereby ohms can be compared to one part in a million. Many instruments and methods of interest to the electrical engineer were exhibited and demonstrated, with the result that a most instructive evening was spent by the visitors.

A correspondent to the "Tribune" contributes an idea to cope with the evils of unemployment, which has at least the merits of novelty and boldness, both of which are somewhat stimulating. He suggests that the whole coast of these kingdoms should be girdled by a continuous railway, connecting with the existing lines, controlled by the Government, and giving tourist, military, commercial, and agricultural facilities. It is estimated that it would take ten years to construct, during which time the labour problem could be carefully considered and solved. The scheme is so Napoleonic in its conception that before condemning it as ridiculous it would be necessary to carefully consider the arguments in favour of it, those against it naturally taking immediate predominance. With our own experience of coast railways the constant dangers to which they are exposed by incursions from the sea and the labour involved in withstanding erosion, we should be inclined to say that the "Tribune" correspondent's scheme of a railway along the whole of the shore line of the kingdom would solve the unemployed question for all time.

Mr. Allanson-Winn is an engineer well known in Dublin, as are also his theories on sea-coast defence works, and the two papers which he recently read on the subject one before the Institution of Civil and Mechanical Engineers, and the other before the members of the Society of Engineers, are, as may be expected, most useful contributions to this important national question. They further elicited a fruitful discussion which indicates the attention the matter is receiving in these islands. The author has, for many years, devoted himself to the subject of deep-sea erosion, rightly considering that the defence works usually erected along the exposed portions of the coast are only partially of service, as no account is taken by their designers of the erosion that is continually proceeding far below low water mark. In proof of his contention Mr. Allanson-Winn exhibited various sections of the East Coast, and it was thereby clearly supported, as the friable material which frequently extends far into deep water necessitates as much protection from currents and whirls as the exposed portion of the shore. To erect substantial breakwaters in deep sea is such an expensive and troublesome operation that the local authorities are slow to engage in such work, and it is to meet these difficulties that the author has invented a chain cable groyne, which he holds is even more efficient, as the action of the sea by its means becomes constructive instead of destructive. To a heavy chain cable are attached bushes and other suitable obstructions, the groyne being thereby formed into a flexible hedge. On the visible shore the cable is securely fixed by iron bars and piles, and in deep water is paid out in the ordinary way from lighters or barges for a length varying according to the necessities of the case from 100 to 300 feet. When thus placed in position, seaweed and other travelling material collects in and around the ledge, the destructive currents are slowed down or entirely diverted, and all kinds of detritus are gradually deposited. This class of groyne has been tried in Ireland under most unfavourable conditions, and so far the results have not been absolutely con-

clusive, but the first cost is so small that experiments do not entail a large drain on local funds. In our last issue we called attention to the pressing necessity for some action being immediately taken on this matter of coast erosion, but the Prime Minister, in answer to a question in the House of Commons, stated he was unable to fix a date for the appointment of the Commission of Enquiry. Since then thousands of acres in the Holderness district have been inundated owing to the recent gales and abnormally high tides, and it is to be hoped that in the national interest members will keep agitating until some satisfactory information is forthcoming.

Gas and electrical experts are naturally always more or less at feud now that the competition between the two illuminants is so keen, and throughout the kingdom immediately there is an improvement in the direction of efficiency or economy of the one, it is quickly responded to by the advance, in a similar direction, of the other. Broadly speaking, the chief claim of gas is its economy, that of electric light its hygienic value and convenience of use. It is round these points that the battle rages fiercely, and it is rather curious to note that Mr. J. H. Brearley, of Longwood, in his presidential address to the Manchester Institution of Gas Engineers, states that "the efforts of the electrician to prove that his light is economical as compared with gas having signally failed, he now falls back upon the claims of healthiness, cleanliness, and handiness. With respect to the claim that electricity is healthier, there are tests published by unimpeachable authorities that show the claim to be not only hollow but impertinent." The speaker further in this connection reminded his audience that the corations were less frequently renewed, and this might become a source of danger to health. We quote this remark as an example of the class of argument which is brought into the question of the relative values of the illuminants. It is one which may commend itself to the builder and decorator, but scarcely to the householder, who is told that it is better for him to have a gas installation in order that, for hygienic reasons, the decorations of his house, shop, or office may become sooted and discoloured—a veritable paradox!

At the time of writing an inquiry by Mr. P. C. Cowan, Chief Engineering Inspector of the Local Government Board, is proceeding with regard to the drainage of the important residential district of Foxrock. The Rathdown No. 1 Rural District Council has applied for a loan of £6,500 for the purpose of carrying out a sewerage scheme for the district, the area of charge to be the entire rural district. No objections have, as far as we are informed, been lodged, which is a highly satisfactory state of affairs, indicating that at length in some parts of the country proper sanitation is coming to be recognised as a necessity and not a luxury. The case is rather a curious one. The Foxrock estate belongs to the Royal Exchange Assurance Co., and in the course of the development in 1899 and 1900 sewers and cesspits were constructed to drain the property. The former were serviceable, but the latter became a nuisance, as they discharged into the stream of an adjoining owner. The Company was immediately called upon to abate the nuisance in January, 1904, and in turn they demanded that the Rural District Council should take over the system on the ground that the drains were sewers under the meaning of the Public Health Act. Some very fine points then arose, and as the Council was advised that a great deal of litigation would be involved, it was sensibly decided to provide a proper system, the Assurance Company agreeing to pay the Council £1,200. The matter, therefore, re-solves itself into a consideration of the details and practicability of the scheme from an engineering point of view, upon which Mr. Comber, the Council's engineer, gave evidence. The site of the septic tanks will be on the Dean's Grange Estate, and the cost of the land required will be £300, a proviso being incorporated in the conveyance that no work will be commenced till the end of the present year.

The general revival of the mining operations in West Cork would point to a determined effort to place these works at last on a sound financial basis. Practically the whole of this district is rich in minerals, particularly in barytes and copper, but for many years past the mines have been worked in a haphazard manner or entirely neglected. Allihies, to the West of the Castletown peninsula, was once famous for



its copper mines, close on 2,000 hands being employed in the extraction of the mineral, and the ruined remains of buildings in the vicinity are a sad indication of past industry. Since those flourishing days several syndicates have come and gone, but, undeterred by such failure, further attempts are to be made to wrest the valuable minerals from their hiding-place. Arrangements have been made to open up the Coosheen copper mine at Schull, and with the modern plant which it is proposed to erect, material results are anticipated. At Brow Head operations are being actively proceeded with, and so far the output of copper has been both considerable and uniform. Mining is to be commenced in Coney Island, Schull Harbour, and negotiations for the purchase of the Dumanus mines are in progress. We also understand that mines at Crookhaven, Castletownbere, Glangriff, and Scaut are being worked by Messrs. Wilson and Co., under the superintendence of Mr. Holmes, a mining expert of much experience. Such extensive operations point to a strenuous endeavour being made to form the mines into a profitable concern, and we extend to the promoters our hearty good wishes for their success, not only on the ground that much-needed employment will be given to the poverty-stricken inhabitants of the locality, but because a favourable issue will react beneficially on other industrial revival schemes throughout the country.

### IMPORTS.

#### PORT OF DUBLIN.

March 7, per Result, from Chester, 180 tons bricks, T. and C. Martin, Ltd.; per Lady Wolsey, from London, 1,710 sacks cement, T. Dockrell, Sons and Co.; 6 firkins lead, Hoyte and Son.

March 8, per City of Belfast, from Ghent, 9,681 bags cement, to order.

March 10, per Lord Charlemont, from Baltimore, 71 tons slates; 1 box iron castings, to order; per Bengore Head, from St. John's, N.B., 1,184 packages white planed boards; 15,483 pieces spruce deals.

March 12, per Elsinore, from Fredrikstadt, 15,393 pieces planed boards and 1,934 pieces scantlings; T. Archer, 1,797 pieces planed boards and 733 bundles laths, Brooks, Thomas, and Co., Limited; per Pennant, from Newcastle, 640 tons cement, N. McNaughton.

March 16, per Bray Head, from New Orleans, 635 pieces poplar boards, to order.

March 19, per City of Malaga, from Hamburg, 14 cises window glass, to order; per Lilleborne, from Treport, 400 bags plaster, 10 tons tiles, 2 cases glass, to order; per Florrie, from Bridgewater, 155 tons brick goods, W. and L. Grove, Limited.

March 20, per Gipsey, from Irvine, 110 tons bricks, etc., Monsell, Mitchell and Co., Ltd.; per Lady Roberts, from London, 1,000 sacks cement, J. Kelly and Son; 30 packages lead, T. Dockrell, Son and Co., Ltd.; 13 packages lead, H. Sibthorpe and Son; 400 sacks cement, to order.

Messrs. W. H. Bowers & Company, Ltd., of Dublin, have notified their customers of the sale of the retail branch of their business. This change in the nature of the firm will be signalled by a change in their trade name also, and in future the firm will be known as William Preston and Co., Ltd. There will be no change in the personnel, membership, or management of the firm. In future they intend to devote their entire time, energy, and capital to the development of their wholesale trade, which has increased during the last four years in an extraordinary degree.

Messrs. William Preston and Co., Ltd., are agents for the following firms, whose specialities appeal to the building and allied trades:—Lewis Berger and Sons, Ltd., varnish, colour and paint manufacturers; Benjamin and Gee, oil, naphtha, turpentine, and liquid fuel brokers; Hamilton and Co. Ltd., paint brush manufacturers; Pettit and Co., cotton waste manufacturers.

Messrs. Carter and Co., of the Encaustic Tile Works, Poole, Dorsetshire, announce that in order to meet the increasing demand for white glazed wall tiles they have recently opened special works at Hamworthy, Poole, for the manufacture of these goods. The premises are of great extent, and being fitted throughout with the latest and most improved machinery, any orders, however large, can be promptly executed. The Encaustic Tile Works at Poole will be, in future, devoted more particularly to the manufacture of constructional faience, terra cotta, decorative tiles, and mosaics, whilst the architectural pottery at Hamworthy will continue to produce every description of floor tiles. Messrs. Carter and Co.'s London office is at 43 Essex-street, Strand, W.C., and their Manchester office at 100 Deansgate.

### THE MEASUREMENT AND FLOW OF WATER.\*

By E. G. COKER, M.A., D.Sc., F.R.S.E.

The prime necessity of a good supply of pure water was recognised by the early civilised communities, in particular the Romans executed many gigantic engineering works for securing to Rome and other cities an ample supply of pure water, and many of their aqueducts still stand to excite our wonder and admiration at the marvellous skill they displayed in the execution of gigantic masonry structures. Their knowledge of hydraulic science was, however, not commensurate with their skill as constructors, and therefore the records which have come down to us, of measurements of water flowing in these conduits, illustrate better the state of hydraulic science at that time rather than models of accuracy in measurements. Much of our information upon this subject is derived from Frontinus, the immediate predecessor of Agricola as governor of Britain, but better known as the author of "De Aquis," in which a very complete account is given of the water supply to Rome during his administration as chief commissioner.

He sought to check many irregularities which had arisen in the distribution of water to the citizens, and with this object in view he measured the discharge from the various aqueducts, and compared them with the discharges from all the pipes and other outlets supplied from these conduits. His measurements were merely based on the cross-sectional areas of the streams, and he appears to have had little or no conception that some streams flow faster than others, so that it is not surprising that his measurements only occasionally appear to agree.

Although Frontinus failed to appreciate the necessity of measurements of velocity, yet he had a dim notion of the effect of head of water on discharge, for he says that in setting ajutages in the supply tanks from which the water was drawn for consumption, care must be taken to set them all at the same level, otherwise the upper one will suck in less, because the current is drawn in by the lower one.

It is not surprising that the law of discharge from an orifice in a tank under a head of water escaped the observation of Frontinus, but it is very remarkable that practically no progress was made for the next fifteen hundred years, and it was reserved for Torricelli (1643) to demonstrate that the discharge from an orifice varies as the square root of the head, while later Bernoulli (1738) gave the law in the complete form,  $v = \sqrt{2gh}$  as we know it to-day.

From this time the science of hydraulics began to make comparatively rapid progress, and the labours of successive investigators resulted in the accumulation of a vast store of data, upon which the modern science is based. It would be impossible within the limits of one or even several lectures to give any adequate account of the results of these researches, and it is, therefore, only proposed to deal with a few of the more recent investigations on the flow and measurement of water.

#### Stream Line and Eddying Flow and Critical Velocity.

The manner in which water flows, and the circumstances which influence its movement were only fully investigated by Osborne Reynolds,† in 1883, although forty years before Sir G. Stokes discussed the matter, and pointed out the general causes which make water change the character of its motion from direct or stream line to eddying or sinuous flow.

Both motions can be readily shown in a glass tube through which water is flowing, if a thin stream of colour is introduced, when it will be observed that for certain velocities the motion draws the colour into a fine band, while, the other velocities the colour is broken up altogether.

The former, or direct motion, is due to each drop of water moving parallel to the line of the tube, while the latter is due to violent eddies being set up, which utterly destroy this direct motion.

The direct motion has been compared to the regular

\* Abstract of Presidential address to the Institute of Sanitary Engineers by Professor E. G. Coker, M.A., D.Sc., F.R.S.E., at the City and Guilds of London Institute, Finsbury, February 20th, 1906.

† "Philosophical Transactions" of the Royal Society 1883.

movement of soldiers on the march, while the sinuous motion has been likened to the motion of a mob.

By far the greatest amount of attention has been devoted to the character of the flow of water in pipes and channels, and it will perhaps be of interest to state briefly some of the results of the investigations of Osborne Reynolds and others.

The unrestricted flow of water from a small circular orifice in a tank is essentially direct, each drop of water moves at the same velocity as any other in its neighbourhood, and a colour band when introduced remains in general unbroken.

If, however, the water is caused to move through a pipe the motion is essentially changed; the principal part of the flow now occurs about the centre of the pipe, and dies down to nothing at the sides. That liquids do not slide over solid surfaces in contact with them is abundantly clear from the experiments of Whetham, who has shown that even with tubes of capillary bore there is no slipping at the boundary of the tube, and other examples might be given of similar results in the case of the hull of a ship moving through the water. The variation of the velocity can be shown experimentally by inserting a small Pitot tube in the pipe which communicates with a V-tube gauge: the water impinging on the mouth of the tube tends to force the liquid along it, and the alteration in the height of the gauge gives us the velocity  $v$  from the formula  $v^2 = 2g h$ .

A great many experiments have been made with the Pitot tube, and some recent experiments by G. S. Williams and others on the new water system of Detroit are extremely interesting and most valuable on account of the great size of the pipes experimented on.

An interesting example by Morrow of direct motion in pipes of about 2 in. diameter, made by the same method, shows curves of the same general character, and in all cases the motion dies away to nothing at the solid surface.

#### LAWS OF RESISTANCE TO FLOW IN PIPES

In practical cases the motion of water is rarely direct, and consequently the eddies which arise make the resistance to flow much greater than if these eddies were absent.

The variation of the law of resistance was first fully investigated by Osborne Reynolds, and he showed that the resistance varies as the first power of the velocity for direct motion, and somewhat less than the square of the velocity for eddying or unstable motion more accurately proportional to  $v^{7/4}$ .

The experiments necessary to prove this were of quite a simple character, and consisted of a straight length of pipe provided with a U tube gauge of a sufficiently delicate character.

Observations of the mean velocity of the water and of the head lost in friction showed that while the motion remained direct the head lost was proportional to the velocity simply, but with eddy motion the resistance increased very much more, and followed the law stated above. The velocity at which this change occurs is termed the critical velocity, and is coincident with the break up of the colour band.

The effect of temperature on the resistance to flow is an appreciable one, and is much more marked for direct motion than for sinuous motion. The variation is shown for a  $\frac{3}{8}$  in. pipe 6 ft. long for a range of about 50 deg. Cent. In this diagram the curve showing the relation of head to velocity is changed to a straight line by plotting the logarithms of the quantities instead of the numbers themselves; the distances between these lines indicates the range of resistance with temperature, while the slope indicates the law of resistance; moreover, the intersections enable us to determine the lowest velocity at which direct motion changes to sinuous. This change may also be measured by taking advantage of the fact that the outer layer of water clings to the pipe, and while direct motion prevails there is nothing to disturb this layer, and it can be heated to a much higher temperature than the water flowing through. If, however, the flow becomes eddying, the sinuous motion causes an intimate mixture of the hot and cold water, and an immediate jump of temperature is noted on an immersed thermometer. In this manner the change from direct to sinuous flow has been observed, and

the results show a general agreement with those obtained by the resistance method.

#### THE RESISTANCE OF BENDS.

The increased resistance due to bends has lately been the subject of much research by Williams and Alexander, and their results bring out the very interesting facts that the bend of least resistance is one having a mean radius of about two and a-half times the diameter of the pipe, and that the resistance of the bend is about three and a-half times that of a straight pipe of the same length.

#### MEASUREMENTS OF DISCHARGE OF PIPES AND CONDUITS.

The need for the automatic measurement of small quantities of water has led to the invention of a large variety of meters of varying degrees of excellence, but it is not proposed to consider such meters here. For very large flows weir measurements are usually adopted, and the researches of J. B. Francis, James Thomson, and others have enabled discharges from weirs to be computed with great accuracy. In some cases the weir method is not convenient, especially when it is required to measure the discharge of a pipe without the loss of the pressure head, and in such cases a form of meter invented by Herschel has been used with very great success. The name "Venturi" has been given to it, in honour of the Italian philosopher who first investigated the flow through cones, rather more than a hundred years ago.

The meter is extremely simple in construction, consisting of a short cone inserted in the pipe line at a convenient point, with its narrow end pointing down stream, and merging into a short parallel neck connected to a long cone, which swells uniformly until it reaches the diameter of the main again.

The arrangement therefore involves a sharp constriction of the pipe, causing a comparatively high velocity through the neck, which gradually falls back to the normal velocity in the down-stream cone.

The high velocity of the liquid through the neck is accompanied by a considerable fall of pressure, in some cases below that of the atmosphere. Experiment shows that the flow through the meter per second is very accurately expressed by the formula  $q = c \sqrt{h}$ , where the head  $h$  is taken as the difference between the water columns attached to the meter, at the point where the water enters, and at the throat respectively, while the constant  $c$  is calculated from the dimensions of the meter and the gravitation constant.

The accuracy of the formula for large flows has been tested by the inventor for discharges through a 1 ft. pipe, and also a 9 ft. pipe, and it was found to agree remarkably well with independent measurements of the discharge. Experiments on small flows in a pipe of about  $1\frac{1}{2}$  in. diameter showed similar results.

Usually the meter is used in conjunction with a recorder in which there is a meter for sewage connected by pipes to two water columns containing floats. Each of these floats is connected to, and moves a bevel wheel, and these latter gear with a bevel pinion rotating upon a loose sleeve of a main spindle. If both floats rise or fall together, the position of the pinion is unaffected, but immediately a difference of level occurs the pinion turns round on the main spindle and moves a pencil over a drum graduated to read rates of flow in gallons per hour. The continuous record is afterwards averaged to obtain the total flow.

Where, however, an automatic record of the total discharge is required, an additional drum is provided concentric with the recording drum, and turned uniformly by the same clockwork mechanism once every ten minutes.

Since the discharge is proportional to the square root of the head, the record marked by the pencil requires dividing horizontally by lines spaced at unequal distances in accordance with this law, and in order to obtain direct readings of the total discharge, the inner drum has a partly raised surface limited by a curve, which, if unwrapped, would show an approximately parabolic form, corresponding to the formula of discharge. This raised surface determines the time of engagement of a pinion operating a dial mechanism by a roller pressed against the raised surface, and automatically raised or lowered by the floats.

The counter is thereby turned by an amount proportional to the discharge, and a direct reading is obtained.



Electrical arrangements are in use by which the recorder can be read from a distance of several miles.

In some cases, as in the connecting mains of the London water companies, the water may flow either way in the pipe, and double-ended meters are then used. For such a case some slight modification of the recorder is necessary.

#### **Measuring Sewage Effluent by the Venturi Meter.**

Besides its application to the measurement of the discharge of water main pipe lines, the Venturi meter has been used for many other purposes. One interesting application is for the measurement of sewage, and at the present time meters for this work are in use in several countries.

Mr. J. P. Wilkinson has very kindly furnished me with particulars of the meters used at the Davyhulme sewage works of the Corporation of Manchester, where one 15 in. meter and four 12 in. meters are installed. These meters have a throat ratio of 1:3, with a minimum registration of 15,000, and a maximum registration of 70,000 gallons per hour. All the meters employed have recorders of the water column type, but are not fitted with counters. The four 12 in. meters are employed in the measurement of sewage effluent from septic tanks discharged from common channels upon the surface of bacteria beds.

In these cases the sewage is screened, and subsequently settled by passage through sedimentation tanks.

It contains from 7 to 14 grains per gallon of suspended matter in a very finely-divided state, all the coarser matter having been removed in the screening chambers and the sedimentation tanks. The bacteria beds at the Davyhulme works are formed in cement concrete, each constituting a water-tight enclosure of about half an acre in extent, and the available depth of water is 40 in. Prior to the filing in of one of these enclosures with clinker, several tests of a 12 in. Venturi meter were made.

#### **Hydraulic Laboratories.**

The importance of accurate experimental investigations in all practical questions relating to engineering need not be argued before an engineering audience, and the establishment of engineering laboratories for the training of young engineers is now a recognised feature of a college course. Yet until recently very scanty facilities were offered in this country for experimental work in hydraulic engineering, although in as far as it affects engineers it is almost altogether an experimental science.

The hydraulic laboratory is a recognised feature of the American College of Engineering, and the subject receives a large amount of attention.

The largest equipment of this kind is that at Cornell University. (Several views were shown through the courtesy of Professor Crandall.)

This equipment is specially well situated, as a considerable stream flows through the college campus, having a drainage area of 117 square miles, with a fall of 400 ft. in a mile, beginning just above the dam.

This latter is curved to a radius of 166½ ft, and is 153 ft. long where it crosses the stream, and it is 30 ft. in height. Above the dam the water forms a reservoir of considerable extent, and there is a main canal leading from this 16 ft. wide, 10 ft. deep, and 400 ft. long, the bottom being 17 ft. below the normal level of the reservoir. A building at the lower end of the canal contains a small branch canal leading into a 7 ft. stand pipe, whereby a head of 70 ft. is directly available from the reservoir. The turbines and other hydraulic machinery are upon the same large scale. In addition to its use for instruction, this equipment has been utilised for experiments of national importance, such as the investigation of the flow of water over weirs and dams made by the Deep Waterways Commission in 1899. An account of these experiments is given in the "Transactions" of the American Society of Civil Engineers for 1900.

The need of special hydraulic equipment as a complement to lectures is now becoming generally recognised, and the recent laboratories at Glasgow and Manchester are exceedingly well equipped in this respect. A more modest equipment is now being installed at the City and Guilds of London Institute, Finsbury, and, although not yet complete, it is sufficiently advanced for a general statement to be made respecting it.

The main engineering laboratory is about 100 ft. in length, and along one side a cast iron channel 4 square feet in section and 80 ft. long is laid in concrete, with its upper edge flush with a cement floor. At intervals there are side pits for receiving and delivering the water discharged from hydraulic machines into the main channel.

At the lower end a cast iron tank, 10 ft. by 7 ft. in cross section, is sunk in the floor, with its base 11 ft. below the floor level.

The proximity of the main walls of the building made it desirable to construct this tank as a caisson with one longitudinal division and the cross ones, forming six compartments, which, when calibrated, may be used singly or in any multiple up to the capacity of the tank. The weir plate may be fixed on the end of the channel directly over the tank or between the first two sections, and in order to facilitate measurements at this latter point, a weir pit is provided with chambers for floats and hook gauges.

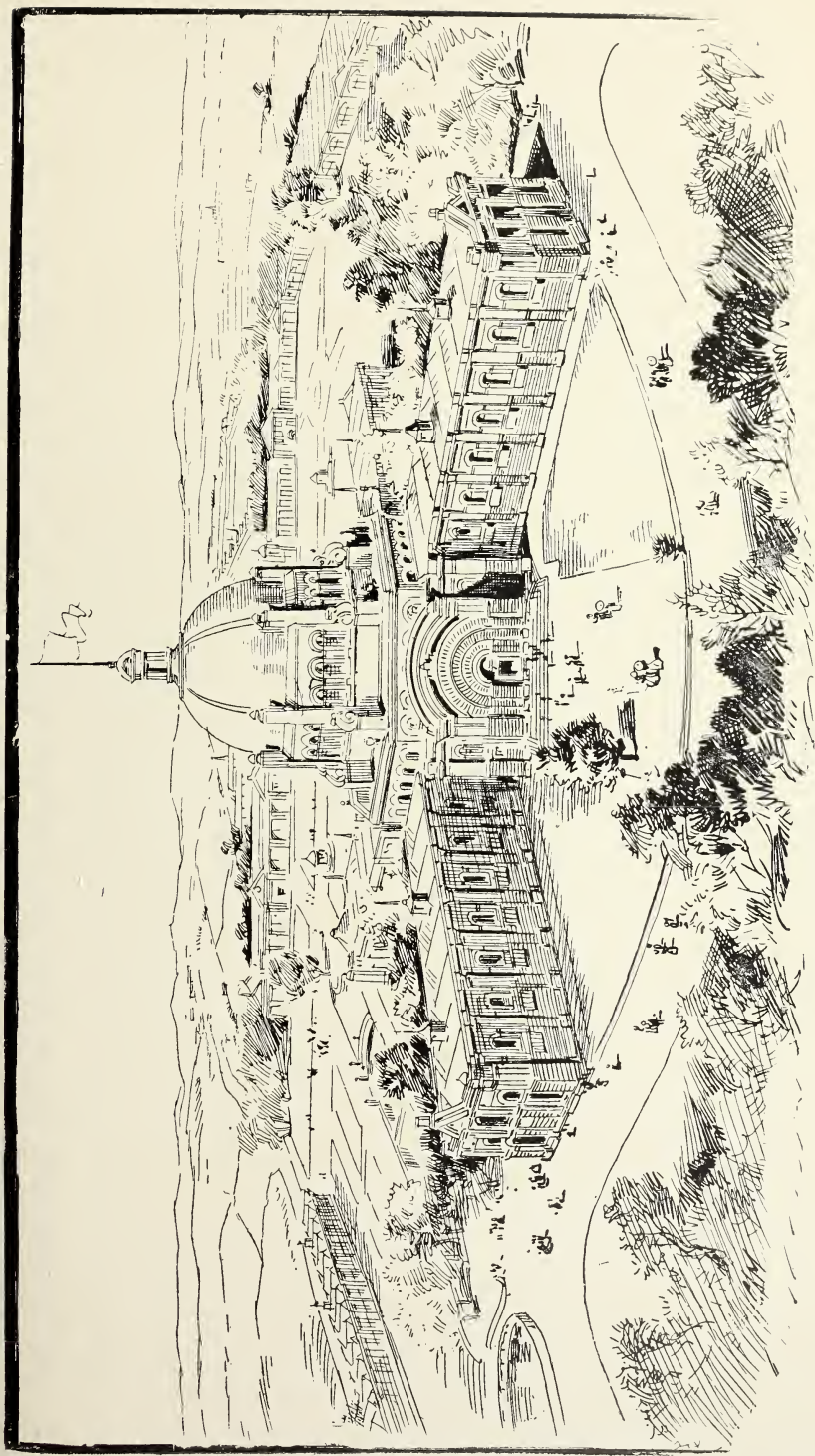
The supply of water for use in hydraulic machines is drawn from a 5,000-gallon tank on the roof, and about 75 ft. above the floor of the laboratory. The water collecting in the measuring tanks will be pumped back into the high level tank, and a large supply will, therefore, be available without making any demand upon the water company.

#### **IRISH CANALS AND WATERWAYS.**

The official announcement of the appointment of a Royal Commission to inquire into the condition of the canals and inland navigation of the United Kingdom will be received with lively satisfaction by all classes. The Government is to be congratulated on thus early indicating its intention to have the present deplorable state of affairs analysed, and the adverse causes, as far as may be practicable, removed. The personnel of the Commission is also an instance of this intention, as it is exceptionally strong, and represents all the interests involved. It consists of nineteen members, the chairman being Lord Shuttleworth, and it includes three other peers, six members of the House of Commons, some financial and administrative experts, and three well-known civil engineers, Messrs. R. C. H. Davison, J. P. Griffith, and J. C. Inglis. The terms of reference, fortunately, give ample scope for a thorough investigation of the subject. The Commission will have to consider such points as the ratio of cost of transmission by waterways as compared with railways, improved modes of propulsion on water, the possibility of adapting the most modern appliances to the more contracted waterways of these countries, and the policy of railway companies in years past of buying up and practically closing competitive canals. The last paragraph of the terms of reference, "the expediency of canals being made or acquired by public bodies or trusts, and the methods by which funds for the purpose could be obtained and secured," would seem to indicate that the return of the labour element to Parliament has already made its influence felt, and that the future nationalisation of the inland waterways is more than a possibility. This field of inquiry is far more comprehensive than that placed before the last Parliamentary Committee, which sat in 1883.

The question of the proper utilisation of these waterways, which have sunk practically into disuse since the extension of the railway systems, is one of the greatest importance to these countries, but more especially to Ireland, where cheap and convenient transit facilities are absolutely essential to uphold her agricultural industry and to improve and stimulate her commerce. In England and Scotland the big and wealthy business communities have made their influence felt upon the railway companies when such action has been necessary, and to such an extent that they are practically, if not theoretically, under popular control. In Ireland the circumstances are entirely different; combined operation, with the requisite capital behind it, has never been forthcoming to impress upon the companies that they are really the servants of the public, and consequently the decay of the canal traffic has left the commerce and industry of Ireland at the mercy of the railway interests, and full advantage has been taken of this monopoly.

The most recent system for improved transit, and this could scarcely be called competitive, will be recollected as the Iveagh-Pirie motor scheme, by which it was sought to establish an extensive motor service throughout the country districts, and bring the remote villages into speedy communication with the main traffic arteries. The cars were to be available for passengers as well as for the conveyance of goods. The scheme at first appeared to be exceptionally healthy, and was rapidly developing into shape, when it suddenly collapsed. The reasons advanced for its disappearance were that some of the County Councils refused to



## THE IRISH INTERNATIONAL EXHIBITION.

A Bird's-eye View of Exhibition and Grounds

Illustration by courtesy of the *Daily Independent*.



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effect the necessary amendments to the roads, and that shopkeepers in several instances were fearful that the improved service would cut both ways, and be the ultimate ruin of the village emporium, by enabling purchasers to obtain goods at a reasonable price elsewhere. It is bad enough in these days that such a want of public spirit should be evinced, and such narrow arguments be forthcoming; it is, however, infinitely worse that for such reasons the whole scheme should be abandoned, and it reflects adversely on the lack of enterprise under which the nation so frequently suffers. There have indeed been rumours of late that the project will be revived; we hope that the fickle jade is for once true, and that under a changed condition of affairs it will receive a more enthusiastic welcome.

With regard to the canal question, Ireland holds an important position, both in the number and excellency of her waterways. They are particularly well suited for commercial intercourse, and there is no lack of them. The Grand Canal and the Royal Canal together have a length of over 260 miles, and besides these there are the Barrow Navigation, the Newry Navigation, and the Lagan Navigation, which total up to a further 100 miles.

Many suggestions as to methods for utilising these waterways to a fuller extent have been forthcoming, and these have been chiefly on the lines of improved motive power, such as an electric motor on a rail, alongside the canal, to tug the existing barges, and also to have barges self-propelled by means of petrol motors. It was also suggested that light railways could be run on a track over the waterway, as it was thought that such tracks could be economically constructed, and the cost of wayleaves, which so cripple a railway scheme at its commencement, be practically obviated. But the whole question has a most depressing effect, and the public has been slow to take up any of the ideas advanced when the interests that would have to be fought have been considered. These interests will certainly be much in evidence at the inquiry, with a weighty influence adverse to any interference with the existing traffic monopoly; but as far as Ireland is concerned the Commission should be able to readily obtain a vast amount of instructive information, which should go far to prevent continuance of the present state of affairs, by which one of the most magnificent of our national assets is rendered practically valueless. If the Royal Commission determines that these inland waterways should be restored to their proper position it may surely deserve the gratitude of the State as a whole and of the Irish people in particular.

### ENGINEERING NEWS.

**Arklow.**—(APPOINTMENT OF ENGINEER).—A special meeting of the Arklow Harbour Board was held on Saturday for the purpose of electing an engineer to superintend the carrying out of the proposed improvement of the pier at Arklow Harbour. Mr. Hugh Byrne, V.C., presided, and the other members present were:—Messrs. Alexander Tailyour, J.P.; Edward Byrne, J.P.; Daniel Condren, M.C.C.; Captain Murray, T.C.; and Richard Kearon, J.P. The secretary, Mr. Doyle, was in attendance. The Chairman, in opening the proceedings, said that there were twenty-one or twenty-two applicants for the position, and they had gone carefully into the qualifications of the candidates for the position, and found that the great majority of them lived out of the country, and others of them that the harbour commissioners thought would be disqualified by the Lord Lieutenant or his secretaries, with whom, of course, the ratification of any appointment rested. At a committee meeting of the harbour commissioners held during the week, the Chairman continued, the number of applicants had been narrowed down to three, and of those three two candidates had sent replies, while one of them had sent plans, which they thought were the best, and consequently they came to the conclusion that the person who had drawn those plans would be a suitable person for the position. Then, again, one of the number was a Mr. McDonald, who had been resident engineer there when the South Arklow breakwater was built, and he was a gentleman fit to take up any position. Applications were also received from Messrs. Hinde and Cheeke, Dublin, concerning whom there was no mention of qualifications in their case, although they had submitted a plan; their suggestion was a groyne from the shore end of the breakwater. Messrs. R. G. Allanson-Winn, 32 South Frederick-street, Dublin, also applied and submitted a plan, and it was mentioned that McDonald had not, though Mr. Kearon said he was acquainted with him. He had drawn plans for him (Mr. Kearon) of the Balbriggan Harbour in his case against the Port and Docks Board, which plans were accepted by the engineer of that body and the judges on the bench. The plans submitted by the applicants were then gone into, and gave rise to some discussion, different opinions being held by the Commissioners as to the merits of the respective plans. On the proposition of Mr. Kearon, seconded by Mr. Murray, it was unanimously resolved that the name of Mr. R. G.

Allanson-Winn should be submitted to the Lord Lieutenant for his approval of that gentleman's appointment as engineer for the carrying out of the Arklow Harbour extension.

**Blackrock.**—(PROPOSED ELECTRIC LIGHTING).—At the last meeting of the Blackrock Urban Council the question of selling the Council's provisional order, authorising them to light the district with electricity, and the new scheme proposed by a syndicate for the electric lighting of Blackrock, Kingstown, and Dalkey were discussed. The Board of Trade wrote that they would defer the consideration of revoking the order until the end of the present year. Messrs. Mills and Tomlinson appeared before the Council, and submitted to the meeting some details of the scheme proposed by the syndicate they represented. Mr. Mills said their proposal was to couple the three towns, Kingstown, Blackrock, and Dalkey, into one central scheme for lighting. The scheme was not what could be called a very fascinating one, because people with money would not be anxious to sink money in the venture if three or four rival schemes were brought forward. Should such a thing occur he did not think any scheme would ever reach maturity. His idea was that if the Council gave him an option, agreed to his scheme, and arranged that there should be no opposition from the Board, there was every possibility of the scheme being a success. But, if opposition were forthcoming, there was not the slightest chance of any scheme being a success. He, and those identified with him, asked the Council for an option of three months. The further consideration of the question was adjourned for a fortnight to ascertain the legal position of the Council in the matter.

**Dundrum.**—(THE MAIN DRAINAGE).—Not until Wednesday last did the Rathdown No. 1 Rural District Council receive the report of the Local Government Board in reference to the important question of Dundrum drainage, on which subject their Inspector, Mr. P. C. Cowan, held a sworn inquiry at the Board-room, Loughlinstown, so long as twelve months ago. The inquiry was held into the matter of an alleged default on the part of the Rural District Council, as sanitary authority, in providing proper sewerage for the district of Dundrum. After carefully reviewing the minutes of the evidence taken at that inquiry, and all the facts and circumstances connected with the case, the Local Government Board decided that the District Council had made default in not providing sufficient sewers, and they have, therefore, intimated that they will give directions for the preparation of an order, under seal, limiting the time for the performance by the Council of their duty in this matter. The Board, however, recognises the difficulties which the Council have met in attempting to deal with the sewerage of this portion of their district, and as they may not be able to acquire by agreement the necessary lands, a period of two years is allowed them in which to execute the necessary works. The attention of the Council has been called by the Local Government Board to a letter which they recently addressed to the South Dublin Rural District Council in relation to an application received from that body for sanction to a loan for the purpose of carrying out a scheme for the sewerage of Terenure, from which letter it would be observed that if the sewerage of the latter locality could be carried along the Dodder valley, it might be arranged so as to provide also for the sewerage of Dundrum, on terms to be agreed to by the sanitary authorities of the two districts. The report of the Local Government Board was discussed at a special meeting of the Council. Mr. P. F. Comer, M.T.C.E., prepared a scheme in outline for the enquiry of a year ago.

**Omagh.**—Omagh Chamber of Commerce and Industrial Development Association held a meeting in the Courthouse on Monday evening. Mr. Percy G. Dallinger, M.A., President occupied the chair. The other gentlemen present were—Messrs. M. Lynch, J. G. F. J. O'Connor, solicitor; D. A. Clements, J.P.; J. J. R. Porter, J.P.; John Drvlin, U.D.C.; C. Donegan, F.A.I.; R. Orr, R. J. Creery, P. J. Glunghy, G. W. Shaw, treasurer; B. J. McCloskey, W. Duak, George Given, T. Johnston, J.P.; W. Calvin, William Thompson and A. E. Donnelly, solicitor, hon. sec. During the evening Mr. Creery initiated a discussion about the canal project from Strabane to Omagh, and the advisability of bringing the matter before the Royal Commission appointed to deal with it. Mr. Charles Donegan thought the scheme practical, and advised the Chamber of Commerce to deal with it. Since the recent discussion on the subject, Mr. Donegan mentioned that he had received an offer of an estimate made by a qualified engineer as to the cost of making a canal from the present one to Omagh and on as far as Enniskillen. Probably the cheaper way would be to adopt the river, but in any case the time was an opportune one for the project. Mr. Donegan was requested to procure the plans referred to, and in the meantime it was suggested that Messrs. Creery, Clements, and Donegan would try and get expert evidence as to the feasibility of deepening the river, etc.

**Rathdowney.**—(WATER SUPPLY AND DRAINAGE).—At a meeting of the Abbeyfeich District Council the L.G.B. asked for particulars as to the proposed improvement of the Rathdowney water supply, and stated that they presumed that the Council wished the dispensary district to be the area of charge, as in other recent cases. Mr. Wm. Carroll gave notice of motion to



fix Rathdowney dispensary district as the area of charge for the expenses in connection therewith, and to rescind the resolution fixing the charge on the rural district of Abbeyleigh. Mr. Daniel Quigley, C.C., hon. secretary of the Rathdowney Drainage Committee, reported that on February 24th the Committee met Dr. Flynn, L.G.B. Inspector, and resolved to ask the District Council "to send a competent engineer to accompany the Clerk of Works and the local committee for the purpose of seeing if their present plans could be carried out, or helping them in formulating a scheme in accordance with the wants and the paying capabilities of the area concerned." Consideration of this communication was postponed pending the receipt of Dr. Flynn's report.

**Thurles.**—THE THURLES WATERWORKS SCHEME.—On Monday morning the employees on the Thurles Waterworks scheme went out on strike for increased wages. The present rate of wage is 14s. a week, but the workmen now claim to be entitled, in accordance with an alleged promise, to an increase of 4s. weekly from the 1st March, from which date work was to have commenced at 6 a.m., thereby increasing the working hours. The workmen appeared on the job at six o'clock on Monday morning, and on being apprised of the contractor's refusal to allow the increase, decided upon ceasing to work, leaving at New-street narrow junction, a long, deep open gullet, which is extremely dangerous to traffic, especially during the fair and market days, Monday and Tuesday. Piles of stones and road stuff are heaped on either side of the gripe, and traffic in that street has practically been suspended, as large stones are strewn carelessly across the road, and, it would seem, dare not be removed off the thoroughfare. The strikers are parading the streets in a body, and one man who attempted to fill in the open gullet came in for rather rough treatment at their hands. Despite the intervention of the police, who are patrolling in the vicinity of New-street, he was pitched headlong into the gripe, and stones and earth were showered on him while in that position. So persistent was the fusillade that he had to desert, and was escorted home by the police. His retreat was lustily cheered by the crowd, and insulting taunts were hurled at him. The strikers appeared to have been very excited, and it is feared that should any attempt be made to substitute workmen a serious *melee* will be inevitable.

**Voughal.**—The Committee of Management have appointed an engineer to take charge of steam, heating, ventilating, and electric plant in the Auxiliary Asylum.

## CONTRACTS.

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Builders desirous of tendering for the retaining walls, vaults, foundations and walls, etc., up to the Ground Floor Level for the proposed new building about to be erected in Upper Merrion-street, Dublin, for the Commissioners of Public Works, can obtain on and after the 15th March, 1906, the Bills of Quantities and Form of Tender prepared for the purpose on application to the Secretary, Office of Public Works, Upper Merrion-street, Dublin, on the payment of £1 1s., to be returned on receipt of a *bona fide* tender.

The Drawings and Specification, etc., may be seen at the Offices of the Commissioners between the hours of ten and five on and after the 15th March, 1906. Tenders to be delivered addressed to the Secretary, Office of Public Works, Dublin, before noon on 4th April, 1906.

The Commissioners will not be bound to accept the lowest or any tender.

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## TOPICAL TOUCHES.

The Dublin Corporation and the Guardians of the North Dublin Union have entered an emphatic protest against the proposal of the Midland Railway Company (the present owners) to close or fill up the Broadstone Basin of the Royal Canal.

The Royal and Grand Canals were originally constructed mainly from public funds voted by Parliament, and failing their being developed and exploited by energetic companies it would be to the interest of the manufacturing and trading community that they should revert to State control.

The Council of the Royal Institute of British Architects last month recommended for election the names of a number of architects to the Class of Fellows. Most of these gentlemen were "black-balled" in the ballot. Elsewhere we comment on the present situation in regard to election to the fellowship and other matters.

The Students Prize drawings lent by the Royal Institute of British Architects, were last week on view at the rooms of the Architectural Association of Ireland, and constituted a notable exhibition of fine draftsmanship worthy of all study. A feature of this year's exhibition is the vigorous competition for the "Owen Jones Studentship," a prize given for the best contribution in colour decoration. A few years ago it was almost impossible to get competition. This year there are a number of really fine examples of draftsmanship in colour.

One of the most remarkable and ingenious designs is the reproduction of an Elizabethan Palace, after the manner of John Thorp; the frayed hand-made paper, and the old-fashioned writing are done to the very life. The conception is supposed to be a realisation of Bacon's ideal palace.

Mr. William Field, M.P., put a question in the House of Commons recently whether the Chief Secretary could explain the delay in commencing the building of the College of Science and Art in Dublin, and whether he could state when the work would be commenced in view of the want of employment in Dublin. Mr. McKenna, in reply, said that the work was commenced a year ago and was still in progress. The answer is misleading, inasmuch as we understand the work in progress to consist entirely of clearing and of foundations, and the work of "building," which Mr. Field referred to, has not even been put up for tender as yet.

The National Foundry Co. of Ireland, Smithfield Square, Belfast, notifies us that they are prepared to make free of cost patterns for any special sanitary requirement, such as manhole inspection traps, frames and covers, connections, etc., or such specials as may be specified for any sewerage or water scheme. There has been a feeling for a long time that certain castings must be procured in England or Scotland. The efforts of the Company are specially directed to overcome this, and they have done so in several instances. Their hope is that they will soon have complete sets of patterns for all the most modern requirements of the engineering and surveying professions in Ireland.

The Dublin Corporation had under consideration on Monday last the question of the appointment of an architect to design the new Technical Schools in Bolton-street, and it was determined to hold a competition. It was not determined whether this should be an open competition, a limited competition, or a competition confined to Irish architects. The latter would seem to be the most equitable and proper determination.

The Corporation of Dublin seems, at last, despite much adverse criticism, our own included, to be able to claim the Electric Lighting Scheme as a thorough financial success. In moving the motion of the Electric Lighting Committee, Alderman Healy commented on the success of the electricity undertaking, explaining the arrangements which are being carried out for the revision of the system in the original lighting area, and for the extensions to various districts of the city, and also explaining the plans on which the supply of electricity to Clontarf is being proceeded with. The report has been already published. He stated the electric lighting scheme had made splendid progress. In 1903 they had 350 subscribers; in 1904 they had 655; in 1905 they had 891 consumers; and in January, 1906, they had 1,058 consumers. Since then they got additional subscribers to the extent of thirty. He merely wished, in conclusion, to thank the Gas Company for the great assistance which they had got from the Gas Company by raising the price of gas (laughter).

The Capuchin Fathers in Cork have commissioned Messrs. Ashlin and Coleman to design an addition to their Church of the Holy Trinity in Cork. The cost, it is anticipated, will amount to about £4,000. This old church on Coal quay, one of the earliest efforts of the Gothic revival in Ireland, has an interesting history. Many years ago the famous Father Mathew, the apostle of temperance in Ireland, projected a new facade to the Church and collected funds for the purpose. A design generally attributed to the late Patrick Byrne, of Dublin, a pupil of Gandon, the architect of the Custom House, was in due course prepared. Having regard to the period at which it was made, the design was a remarkably fine one, elegant in its proportions and graceful in its details. The tragic years of the famine came, and Father Mathew devoted his funds to feeding the starving people surrounding him. Not until 1889 were the Capuchin Fathers in a position to revive the project, when they instituted a competition for the designing of the front, Mr. G. C. Ashlin being the assessor. Many leading Irish architects took part in the competition, which resulted in the late Walter Doolin being awarded first place, Mr. Arthur Hill, of Cork, second, and Mr. D. J. Coakley, also of Cork, third place. Mr. Doolin was given the first prize of £50, but unaccountably, the work was ultimately entrusted to Mr. Coakley, from whose designs it was carried out. Patrick Byrne's design was available, we understand, to all the competitors, and most of them based their suggestions upon its fine lines. Several fine Catholic churches of the period are attributed to Byrne—St. Mary's, Haddington road, "Our Lady Refuge of Sinners," Rathmines, and the Jesuit Church, Upper Gardiner-street, but there is no authentic evidence available to show which he was really responsible for—the probability is that Gardiner-street Church, at least, was not his.



## POINTS SUGGESTED BY THE CHARING CROSS ROOF FAILURE.\*

By W. NOBLE TWELVETREES.

## INTRODUCTION.

No mishap within recent times has attracted more attention in engineering circles than the partial failure of the Charing Cross Station roof in December last.

Some railway accidents and fires have occasioned greater loss of life, and more serious collapses have occurred in the United States, but railway accidents and fires come under the head of purely accidental occurrences, and the failure of American railway bridges and other structures that could be mentioned are known to have been the result of inadequate strength, due to risky design or bad workmanship.

The Charing Cross roof, however, was well designed and well built, and for this reason its partial failure has aroused some doubt as to the continued safety of iron structures dating from the middle of last century, and has also raised the question whether iron and steel ought to be regarded as permanently trustworthy materials of construction.

It should be noted that these materials are employed under very different conditions in structural work. Iron members incorporated in a bridge or a roof are more or less fully exposed to climatic influences, except for the inefficient protection afforded by a thin layer of paint. They can be inspected and renovated as occasion demands, and so the life of the structure—whether it be of cast iron, wrought iron, or mild steel—may be extended almost indefinitely. This point is sufficiently demonstrated by the continued existence of many historic iron structures built by the early engineers.

As to the endurance of iron and steel embedded in brickwork, as customary in architectural practice, there is little more than negative evidence. No building has collapsed hitherto owing to the failure of iron or steel members as the result of corrosion, but there is no saying what may happen in the future. The practice of burying steel columns and girders in walls, where they are imperfectly protected from climatic influences, and from moisture percolating through the brickwork, is one obviously contrary to the dictates of prudence. Hence, for the protection of iron and steel employed in this way, something more efficient and more durable than a mere coating of paint is certainly desirable.

The Charing Cross roof affords an example of iron employed under the first of the above-mentioned conditions, and before the essential facts became generally known various erroneous theories were put forward to account for its failure. Engineers suggested as possible causes—loss of strength by fatigue or corrosion, excessive strain on the tension members owing to the loosening of connections for the purpose of cleaning or of effecting repairs, or to the weight of the platforms suspended from the roof members for the use of workmen. Architects have suggested that subsidence of the foundations, owing to tunnelling operations, may have been responsible for the failure of the roof, and the view was very generally expressed that corrosion may have been the originating cause. As will be shown later, none of these theories were correct, for it has now been proved that the immediate, if not absolutely the originating, cause was the fracture of the main tie-bar in principal No. 1, or the first roof truss from the south end of the station.

## Description of Charing Cross Station.

With the object of helping to make clear subsequent references to the failure, the main constructional features of Charing Cross Station are stated below, and illustrated by the various figures in Plate I. Similar illustrations and a brief description of the roof will also be found in Mr. Walmisley's work on "Iron Roofs."<sup>†</sup>

As members of this Institution are doubtless aware, the station was built in 1860-3, from the designs of the late Sir John Hawkshaw, by Messrs. Cochrane, Grove and Co., of Dudley. The area covered measures about 510 ft. long by 165 ft. wide, the roof being supported by brick walls on the east and west sides of the station. The roof principals were designed as self-contained trusses, the outward thrust of the main ribs being resisted by tie-bars and bracing. The height of each wall above platform level is 40 ft., the total height above ground level increasing from 40 ft. at the Strand end to about 60 ft. at the Victoria Embankment end of the station.

The walls of the superstructure consist of brick piers 3 ft. 8 in. thick, connected by arches, and filled in with panels of 18-in. brickwork. Stone coping blocks were placed on the pier tops to receive the feet of the roof prin-

cipals and the ends of the heavy box girder forming the bottom member of the wind screen. At the southern extremity of the station the piers were made somewhat thicker than the others, but still not thick enough to eliminate the element of undesirable weakness at the free end of the walls. After completion of the station building, the east wall was stiffened by the addition of arched buttresses projecting about 15 ft. beyond the wall piers, as shown in the general plan (Plate I.). These buttresses gave access to the Charing Cross foot bridge. The entire roof included fourteen principals, spaced 35 ft. apart, in addition to the wind screen, the clear span being 164 ft. between the walls. The general arrangement of the station will be made clear by inspection of the plans in Plate I. An elevation of one roof principal, and some details of the construction to larger scales, are given in the same Plate.

The main rib of each principal is a curved wrought iron plate girder, with the versed side of 45 ft., built up of a web plate 18 ins. deep by  $\frac{1}{2}$  in. thick, and flanges of 6-in. by  $\frac{1}{2}$ -in. angle-bars. Each end of the rib opens out to the width of 2 ft., as represented in the end view of the principal (Plate I.). At the east end, the principal is fixed to the stone cap of the wall, and at the west end a suspension link saddle provides for expansion and contraction, this detail being shown by one of the small drawings in Plate I.

To make the roof principal self-contained the main rib was trussed, as shown in the elevation, the chief members of the bracing being eight vertical struts dividing the construction into nine panels, each strut consisting of two 6-in. by 3-in. by  $\frac{1}{2}$ -in. T-bars; two diagonal ties in each panel of 4-in. by  $\frac{1}{2}$ -in. flat bars; and a cylindrical tie-bar, in nine connected lengths, forming the lower member common to all the panels. The struts and diagonals are riveted at the top to wrought iron plates secured to the main rib, and at the bottom to two similar plates connected with the screwed coupling boxes of the tie-bar, as represented in Plate I.

The nine lengths of the tie-bar are of the following diameters:—End panels,  $\frac{3}{4}$  ins.; second panels,  $\frac{3}{8}$  ins.; third panels,  $\frac{1}{2}$  ins.; fourth panels,  $\frac{3}{8}$  ins.; and centre panel,  $\frac{1}{2}$  ins. At each end of the truss the tie-bar is fixed into the projecting connection, as shown in Plate I., cotter and gib fastenings being provided for the regulation of tension. Each length of the tie-bar was made with enlarged ends screwed into the coupling boxes, and, in accordance with the practice prevailing at the time when the roof was built, the enlarged ends were welded to the body of the bar.

The fourteen roof principals are connected by purlins, sixteen in each bay, consisting of girders, 10½ ins. deep, with latticed webs of 2-in. by  $\frac{3}{8}$ -in. flat bars and flanges, each formed of two 3½-in. by 3-in. by  $\frac{1}{2}$ -in. angle-bars. The purlins are stiffened by two parallel lines of bracing, as shown in the part roof plan, and the glazing is supported by T-bars, as illustrated in the section of the main rib.

## The Successive Phases of the Roof Failure.

Having stated the main constructional features of the Charing Cross Station and roof, the next matter for consideration is the manner in which the roof failure gradually developed after the warning given by the sudden fracture of the main tie-bar in principal No. 1, next to the wind screen at the south end of the station. The failure of the tie-bar took place at 3.30 p.m. on December 5, 1905, and was accompanied by a loud report, to which little attention was paid outside the station, owing to the belief that the noise proceeded from an unimportant collision between two trains. The length of the bar that snapped was that in the third panel from the west wall of the station, and as the connections at the foot of each strut between the point of fracture and the wall broke away, the first and second lengths, and part of the third length, descended until that part of the bar assumed an angle of about 20 degrees below the horizontal. Therefore, one-third of the truss naturally commenced to spread out towards the west, this action being resisted for a time by the stiffness of the main rib, the strength of the bracing, and the reaction of the outer wall.

As the damaged principal sank the top of the semi-circular wind screen moved slowly inwards, until at 3.45 p.m. the principal pushed over a portion of the wall and fell across the station. The thrust of the principal had also the effect of dragging the east end of the wind screen from its support, with the result that, a few seconds after the first collapse, the wind screen toppled inwards and pushed over a further portion of the station wall.

The overturned portions of the west wall fell bodily upon

\* A paper read before the Institution of Civil Engineers of Ireland on 7th February 1906.

<sup>†</sup> "Iron Roofs," Second Edition. Arthur T. Walmisley, M. Inst. C.E., London: 1887.

the Avenue Theatre below and almost entirely wrecked that building. It remains to be added that the tie-bar of principal No. 2 was also broken near the east wall of the station, probably by strain or shock arising from the fall of the second roof bay. But an important point is that principal No. 2 did not collapse.

From beginning to end the time occupied was rather more than 15 minutes, and the successive phases of the collapse may be summarised thus:—

- (1) Fracture of the main tie-bar.
- (2) Separation of the tie-bar from the bracing.
- (3) Failure of the bracing.
- (4) Inward inclination of the wind screen.
- (5) Fall of the roof principal and wind screen.
- (6) Partial overthrow of the west wall.

Although it is now known that the collapse was directly due to the fracture of the tie-bar in principal No. 1, it must not be supposed that examination of the conditions leading to the rupture of that member will suggest all the lessons to be learned by the Charing Cross failure. Naturally, the conditions in question formed the main, if not the only, subject of inquiry by the Coroner's Court, but members of this Institution will find it both interesting and instructive to consider each individual phase of the failure. Having had an opportunity of visiting Charing Cross Station and the Avenue Theatre shortly after the disaster, the author hopes that some remarks upon the development of the failure will not be thought inappropriate.

#### Notes on the Development of the Failure.

The following notes are arranged in the order enumerated above:—

(1) *Fracture of the main Tie-bar.*—On the occasion of the first visit paid by the author to the scene of the disaster the broken tie-bar was still in the place occupied immediately after its fall. In descending one of the bars broke a water-pipe, and became so rusted in consequence that no conclusion could be formed as to the condition of the metal at the point of fracture. Two days afterwards the other part of the bar was discovered, and, having fallen in a dry place, the end had not been rusted, and presented indications at once pointing to an original defect—either a defective weld made when the enlarged end of the bar was shut on or a defective weld made during the manufacture of the bar itself.

The diameter of the bar at the place of separation, was  $4\frac{1}{2}$  ins. originally, but the diameter had been reduced by corrosion to 4.4 ins. This diameter corresponds to the sectional area of 15.2 sq. in., and as the strain upon the bar is stated by Mr. Percy Tempest, the Engineer to the South Eastern and Chatham Railway, to have been 80 tons at the time of failure, the actual breaking strain calculated upon the area of 15.2 sq. in. was 5.3 tons per sq. in., approximately. Taking the ultimate tensile strength of the wrought-iron at 22 tons per sq. in., which is about correct for the Dudley iron employed in this case, it is evident that the bar broke when strained to less than one-fourth of its normal ultimate strength, or to about one-third of its ultimate strength if an allowance of 30 per cent. be made for reduction of strength by yielding.

Figs. 1 and 2 represent the appearance of the fractured tie-bar—one of these illustrations having been drawn from a photograph and the other from a sketch taken on the site. It will be observed in Fig. 1 that there are two unshaded areas at the bottom of the cross section, and some isolated unshaded areas of small dimensions. In these, which represent about one-third the total area of the bar, the metal had the lustrous appearance indicative of recent fracture.

In the remaining area the surface of the metal was discoloured, and in the middle of the bar there was a circular core where the metal contained cinder, and indicated that there never had been metallic connection between the fibres in the two parts.

Judging from the side view of the bar in Fig. 2, it does not seem improbable that the separation may have taken place at a weld. Whether or not this was the case is not very material; the main facts, as proved by the evidence of Sir John Wolfe Barry, Sir Benjamin Baker, and Mr. Percy Tempest, being that the central portion of the bar in the line of fracture had never been in metallic communication, and that the flaw, originally enclosed by sound metal, had gradually extended outwards until the resistance of the bar became less than the strain imposed at the time of failure.

In his evidence before the Coroner, the foreman in charge of the roof repairs stated that "a diagonal brace had cracked almost in the centre of the roof." It is not at all clear whether this brace gave way before or after the severance of the tie-bar. If before, it may have occasioned sufficient additional strain upon the tie-bar to constitute the

proverbial last straw; if after, it would obviously be a result of the tie-bar failure, and consequently of no significance. Suggestions have been made to the effect that the final yielding of the bar may have been caused by the slackening of fastenings by men engaged in cleaning and repairing the roof, and by the weight of the platforms suspended from the roof members for the convenience of workmen. At the present time it is impossible to pronounce any opinion upon these points, and the only theory that Mr. Tempest could suggest was that the metal remaining sound was so highly strained that there was no saying when it might not have given way. Whatever may be thought upon this point it is abundantly clear that the roof principal was in a most critical state at the time of the disaster, and that a very small disturbance would be quite sufficient to sever the sound portions of the metal. The only wonder is that they should have remained intact so long as they did.

A good deal of unnecessary trepidation has been experienced by the general public, and perhaps also by some engineers, in consequence of the mistaken impression that the main tie-bar of the roof principal failed owing to the effects of fatigue or other molecular change in the structure of the metal. The facts stated above are sufficient to prove there was no mystery at all about this failure; it was simply due to an original defect in the bar, which had been slowly extending for more than forty years. Hence, much of the doubt that has been expressed as to the probable safety of other large roofs throughout the United Kingdom is quite without foundation. There may be some reason, however, for questioning the existence of similar flaws in tie-bars made and applied in structures erected between 1850 and 1875, for during that period the resources of iron manufacturers were not equal to the rolling and preparation of tie-bars so large as those used at Charing Cross without the employment of welds.

In this connection it may be interesting to recall the remarks made by the late Sir Henry Bessemer at the 1856 meeting of the British Association when describing his "entirely new process of manufacturing malleable iron and steel." Sir Henry (then Mr.) Bessemer said:—"It is true that, hitherto, no better method had been known than the puddling process, in which from 4 cwt. to 5 cwt. of iron is all that can be operated upon at a time, and even this small quantity is divided into homeopathic doses of some 70 lbs. or 80 lbs., each of which is moulded and fashioned by human labour, carefully watched and tended in the furnace, and removed therefrom, one at a time, to be carefully manipulated and squeezed into form."

Owing to the small amount of metal contained in one of these "blooms," the process of making iron bars of large diameter had to be performed by piling six or more flat bars, one on top of the other, so as to make up a square section. When making up a "pile" in this way, short bars were sometimes interposed, and the ends of these short bars were not always perfectly united, the result being an internal flaw in the bar. The circular bar was formed by welding all the flat bars of the pile together, and by reducing the pile to circular form by mechanical treatment in the rolling mill. When the ends of a bar had to be enlarged for the purpose of connection, the enlarged ends were separately made and welded on to the body of the bar, sometimes with a "scarf" weld, but more generally with one of the "bird's-mouth" type.

Since mild steel came into general use in construction, about the year 1880, bars of large diameter have been made without welds from a single ingot of metal, and the appliances at the disposal of iron and steel manufacturers have enabled them to "upset" or "jump" the ends, as necessary, so as to avoid the known weakness of welded joints, and the unknown factor represented by the varying skill and carefulness of the workmen by whom welds were formerly made. Therefore there is no reason whatever for anticipating failures of the kind that occurred at Charing Cross in the case of any modern structures, and, so far as this particular point is concerned, there is no general lesson to be derived from that occurrence.

With regard to some of the earlier iron roofs still in service, there certainly may be reasonable ground for fearing the existence of weak places in the tension members. This view is to some extent confirmed by the fact that in advising the demolition of the present Charing Cross roof, Sir Benjamin Baker was actuated by the consideration that he could not be certain that other flaws did not exist.

Shortly after the accident the author expressed the following opinion:—"It is a point for serious consideration whether the safety of a great structure should be allowed to hang upon a single tie-rod, however strong or perfect it may appear to be. That was almost certainly the case at Charing Cross, and is the case elsewhere. Duplicate tension bars would not cost much, and if they were adopted



one might break without any harm being done. A new tie-rod is less expensive than a new roof."

That view was endorsed by the evidence of Sir Benjamin Baker to the effect that the practice of the present day "would not be to trust a roof like this at Charing Cross to a single tie-rod, they would have two, so that if there was an invisible flaw in one they would have another to fall back upon." No doubt, all really practical designers in the present day employ duplicate bars in roof trusses, but it is to be feared that the practice is by no means so universal as it should be.

(2) *Separation of the Tie-bar from the Bracing*.—By the detail drawing showing the coupling of the tie-bar in Plate I. it will be seen that, while each group of three members in the bracing is very securely connected at the junction with the main rib, the similar connection at the tie-bar couplings is not so secure. In view of the fact that the fractured tie-bar of the first principal broke away from the bracing, and that the broken tie-bar of the second principal also hung free from the bracing of three panels, it is clear that the connection could not have been very strong.

The point is of importance, because if the connections had been of better character the effects following the failure of the tie-bar might have been further delayed, and so have given more time for the escape of those engaged upon and below the roof. In the design of Cannon-street Station, erected in 1862-6, Sir John Hawkshaw adopted a far stronger and more workmanlike type of connection for the tie-bars and bracing of the principals, and, apart from the use of single ties and the unavoidable use of welded joints, the construction of that station roof does not suffer by comparison with that of any more recent structure of similar character.

(3) *Failure of the Bracing*.—Whatever may have been the resistance of the main rib and of the west wall to the outward thrust of the principal, the bracing had evidently to sustain very heavy strain, and the fact that the gradually sinking principal did not actually fall until some fifteen minutes had expired after the first warning of the impending disaster is a striking testimony to the soundness of the materials and workmanship in the main rib and bracing.

The only point suggested by the behaviour of the bracing is the complete satisfaction given by wrought-iron members made without welds, after forty-five years' continuous use, and after the inevitable diminution of strength by corrosion during the same period. In the manifested strength of the bracing, engineers may find a complete refutation of foolish statements to the effect that iron construction is still on its trial, and that we do not know what its ultimate fate may be.

(4) *Inclination of the Wind Screen*.—This development was obviously unavoidable in a roof built like that at Charing Cross, for the progressive sagging of the damaged principal would necessarily draw over the top of the wind screen towards the inner part of the station.

It must be remembered that the wind screen differed in design from the roof trusses, and consisted of a curved main rib tied between the two ends by a heavy box girder stretching from wall to fall, the segment between these members being filled with rectilinear bracing, which also served for the attachment of sash bars for the glazing. Owing to its position at the extremity of the station, and to its great weight, the screen was far more liable than any of the roof principals to be drawn over towards the deflected portion of the roof. The accuracy of this view is supported by the fact that principal No. 2 was not pulled over, either by the gradual subsidence or by the final collapse of the adjacent principal.

Bearing in mind the disastrous part played by the wind screen in completing the wreck of the station wall, we have a clear suggestion that the gable end of a large station roof ought to have efficient lateral support.

An example of this kind of construction is afforded by the gable screen of Cannon-street Station. This structure is described by Sir John Wolfe Barry in the following words\* :—

"At the southern end of the roof, and resting on the two towers, is the gable screen. It consists of two wrought-iron trusses, segmental at the top, of the same radius as that of the roof, and nearly horizontal at the bottom, the trusses being 50 ft. deep in the centre. These two trusses are 11 ft. apart from centre to centre, and they are connected together at numerous points, so as to form one large girder. A camber of 12 ins. was given to the bottom, in order to avoid the appearance of sagging, which is so noticeable in long horizontal lines. The glass is carried in the gable screen in wooden frames, made to fit between the iron struts and ties."

If a double truss of this type, firmly held down to substantial walls, had been erected at the end of Charing Cross Station, it certainly would not have fallen sideways, and the consequences of the tie-bar failure would have been far less disastrous.

(5) *Fall of the Roof Principal and Wind Screen*.—Very little remains to be said with respect to the fall of the roof truss beyond the remark that, after inspection of the ruins, the author formed the opinion that the principal first pushed out the west wall and so dragged the girder of the wind screen from its eastern bearing. This conclusion is confirmed by the evidence given by engineering draughtsmen in the Admiralty Works Department, which overlooks the scene of the accident.

(6) *Partial Overthrow of the West Wall*.—Next to the fracture of the main tie-bar in principal No. 1, the most suggestive phase of the disaster is that represented by the partial demolition of the west wall, and the consequent destruction of the Avenue Theatre.

In the discussion of his paper on "The City Terminus Extension of the Charing Cross Railway," read in 1868, before the Institution of Civil Engineers, Sir John Wolfe Barry said that "at Charing Cross and Cannon-street Stations the position of the streets prevented the employment of any side abutments to sustain the thrust of the roofs, which therefore had to be self-contained." This is the reason why so careful and experienced an engineer as Sir John Hawkshaw was compelled to mount the roof principals upon the top of high walls incapable of resisting lateral thrust to any appreciable extent.

Some light is thrown upon the wall design of the station by a recent statement emanating from Mr. Russell Aitken, to whom the plans of the Cannon-street Station were handed for revision. Mr. Aitken says: "These designs had apparently been based on methods of calculation similar to those employed in preparing the plans for the Charing Cross Station roof and side walls; and, although I found the results were far from satisfactory, I was not prepared to substitute any other method of calculating the strains to which such structures are subjected until a friend of the late Mr. Froude told me of his then new formula for calculating strains in masonry structures—such as masonry dams for impounding water, brick walls for carrying railway station roofs, etc.—and on applying Mr. Froude's mode of calculation to the walls of Cannon-street Station I found that they had to be made more than twice thicker than the Charing Cross Station walls, and that consequently the latter were not strong enough."

Apparently it was in consequence of the report by Mr. Aitken that the arched buttresses were added on the east side of Charing Cross Station, as mentioned in the earlier portion of this paper. If the same course had been followed on the west side the probability is that the breakage of the faulty tie-bar would not have been followed by very serious consequences. This surmise appears to be supported by the fact that, although the main tie of principal No. 2 had broken and hung loose for a length of three panels at the east side of the station, the truss itself did not collapse. The reason for this evidently was that the walls possessed sufficient lateral strength to enable them to hold the truss together with the help of the resistance offered by the main rib and the bracing. The reinforced east wall being near to the fracture would be of great value, and it was probably the case that the masonry of the west wall opposed the truss in question would be stronger than the free end of the masonry at the south extremity of the station, and the author's opinion is that the combined elements of resistance were just able to keep in check the expansion of the damaged principal.

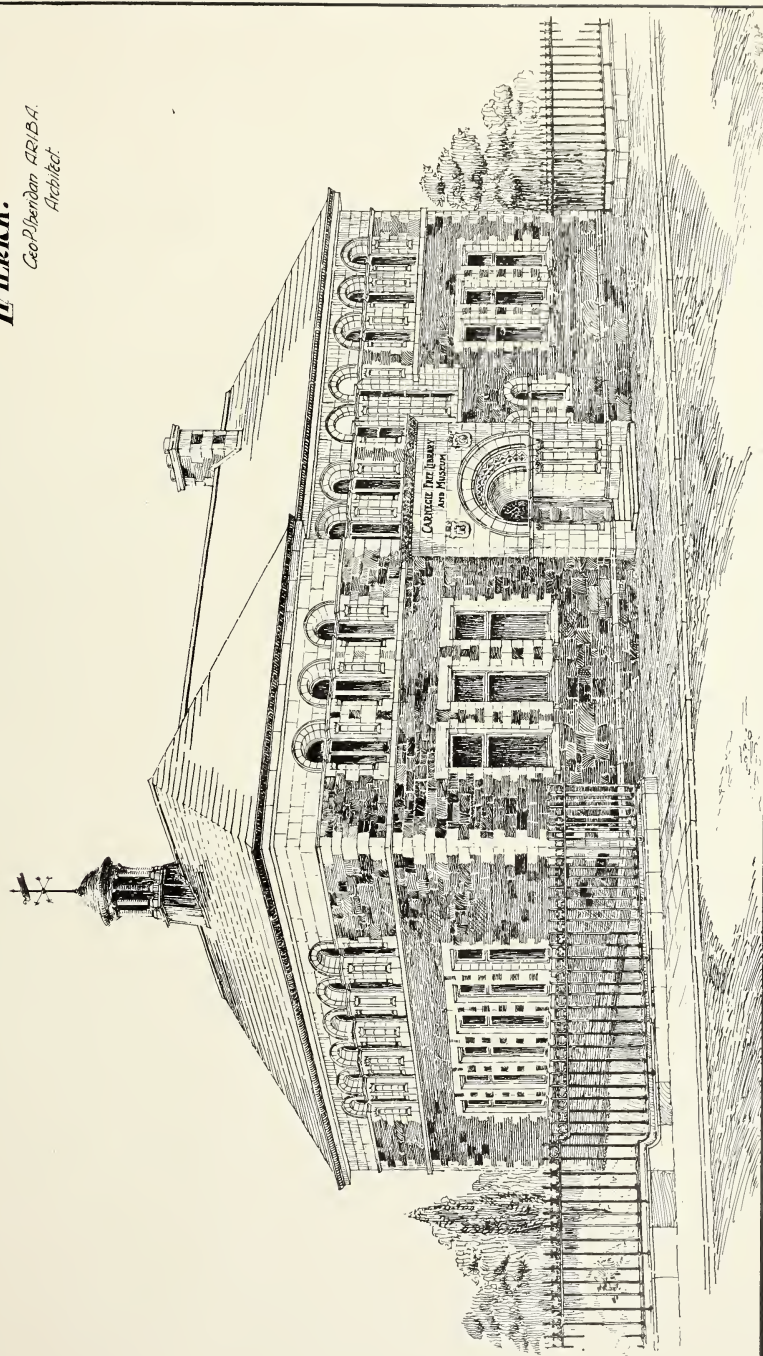
Unfortunately, land could not be obtained at the west side of Charing Cross Station for the building of abutments, and the wall was left of the original thickness. A public foot passage runs between the station and the Avenue Theatre, and it is probable that if the railway company had been convinced that the safety of the roof would have been materially increased by the strengthening of the west wall they would have been able to obtain powers for building arched buttresses over the foot passage.

In addition to the normal weakness of the west piers, there is some reason for suggesting that the brickwork may have become weakened by alterations of thrust and pull in accordance with temperature variations. As shown in Plate I, the free end of the principal was fitted with a suspension link saddle to prolide for expansion and contraction. Members of this Institution are aware that the most perfect arrangement of expansion rollers does not always operate in the manner intended, and the device here indicated, having a hinged joint, would be still more likely than rollers to become made up by rust, and the practically irresistible expansion of rust. Assuming the expansion saddle to have become fixed, the roof trusses would still

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be free to expand upwards, but that would not relieve the west wall from alterations of push and pull induced by temperature variations.

A visit made to the Avenue Theatre shortly after the accident revealed a remarkable state of ruin caused by the huge masses of brickwork that fell from the vicinity of the roof-truss and the wind screen respectively. The roof of the theatre was completely smashed in, and the front wall of the building had been forced at least 8 ins. out of the vertical. From an engineering standpoint, the most interesting objects to be seen were the suspension link saddle in which the free end of the roof principal had rested, and one of the coping stones, weighing about 3 tons, which had penetrated the roof and stage floor of the theatre, finally coming to rest in the basement.

#### Summary of Points Suggested by the Failure.

Among the more important of the points suggested by the foregoing discussion of the Charing Cross roof failure are the following:—

(1) That welded tie-bars made in the days of wrought-iron, and still remaining in large roof structures, should be supplemented, especially if not in duplicate, by auxiliary tension members. The most convenient manner of applying such reinforcement will probably be found in the employment of steel cables, as adopted by Sir Benjamin Baker in the case of the Crystal Palace roof, and later from end to end of the remaining principals in the Charing Cross Station roof.

(2) That the connections between the main members and the bracing of roof structures should be as secure as possible.

(3) That wind screens should be designed so as to provide that such structures shall not have the effect of decreasing the safety of the roof.

(4) That the practice of mounting large roof principals upon lofty walls, and especially when the level of the site is such that the height of the walls is further increased by the sub-structure as at Charing Cross, involves risks of so serious a character, in the event of unforeseen failure, as to make this type of design extremely undesirable.

A final suggestion, not arising directly out of the Charing Cross failure, is that the imposition of roof trusses upon exceedingly lofty supports renders inspection and maintenance unnecessarily difficult and costly. Owing to this feature it is by no means improbable that the Charing Cross and the Cannon-street Station roofs have not received the same amount of attention that would have been accorded had they been situated at lower levels. The author does not for a moment mean to imply that these roofs have been neglected. The Cannon-street roof has recently been thoroughly overhauled, and there is ample evidence to show that, since his appointment in 1899 as Chief Engineer to the South Eastern and Chatham Railway, Mr. Tempest has been particularly careful to satisfy himself that the Charing Cross roof was properly maintained.

Of course, after more than forty years of existence, it is only natural that the metal should have been diminished in thickness by the effects of corrosion, and this is in itself a sufficient reason for a radical departure from some forms of design that have prevailed from the early days of iron roof construction almost up to the present date. Most of the railway station roofs built since the middle of last century are representatives of the two great orders of truss construction and arch construction. Some designers have preferred one type and some the other, but there has been a general agreement as to the necessity for building spans of great width so as to provide unobstructed space for the requirements of traffic managers.

#### Roofs of the Charing Cross Type.

The roof of New Street Station, Birmingham, with a maximum span of 212 ft., may be regarded as the prototype of what is here termed the Charing Cross type. The Birmingham roof, designed in 1851 by Messrs. Fox and Henderson, with the assistance of the late Mr. R. M. Ordish, still remains as a magnificent specimen of early engineering. About the same time Mr. Berkeley built the Frenchurch Street Station roof with the span of 106 ft. Charing Cross and Cannon Street Stations followed in quick succession, and among other well known examples of kindred design may be mentioned the roofs of Westland Row Station, Dublin, London Bridge Station (L. B. and S. C. R.), Blackfriars Station, London, and Lime Street Station, Liverpool. Two of these roofs are worthy of special remark for the reason that the main tension members were duplicated. The Blackfriars Station roof, now taken down, was of excellent design, and the employment of duplicate tie-bars gave that element of security which is so much to be desired. The extension of the Lime Street Station roof, completed in 1875, has a span of 191 ft., and is a very fine example of practical construction which it would be difficult to im-

prove upon in the present day. Apart from its other meritorious features, the roof is quite safe from any accident such as that which overtook the unfortunate structure at Charing Cross, as with four solid-forged links in each length of the main tie, one or two bars in every length might break without involving the collapse of the roof. Another form of design generally resembling that adopted at Charing Cross, although differing in points of detail, is represented by the roofs of Victoria Station (S. E. and C. R.) London, the Central Station, Liverpool, and Queen Street Station, Glasgow. But in these three roofs single tie-bars are relied upon to take the thrust of the principals which, in view of the fact that the spans measure 129 ft., 160 ft., and 170 ft. respectively, cannot be regarded as a satisfactory feature.

The foregoing are only a few of the numerous roofs that have been built in the United Kingdom of design similar to that of the Charing Cross roof, and it is a significant and re-assuring circumstance that the latter is the only structure of the kind that has developed any serious defect.

#### Arched Roofs

The Paddington Terminus, London, may be mentioned as the first railway station to be covered by wide and lofty spans not requiring the employment of tie-bars. The roof was built from the designs of Brunel about 1856, and includes three arches—a central span of 103 ft. 6 in., and two side spans of 70 ft. and 68 ft. respectively. King's Cross Station, London, was really the first railway station to be arched over, but the original structure consisted of timber ribs. These were erected in 1851, the two spans having been replaced by wrought-iron ribs of similar design in 1869 and 1887 respectively.

St. Pancras Station, London, built in 1867, under the direction of Mr. W. H. Barlow, F.R.S., from the designs of Mr. R. M. Ordish, represents a type that may be considered as arch or girder construction, according as the thrust of the main ribs is resisted by abutments or by horizontal ties. At St. Pancras, the clear span of the roof is 240 ft., and the ribs are connected by horizontal ties below rail level, but the thrust is almost entirely resisted by the abutments. Two noteworthy examples of similar design in America are the roofs of the Pennsylvania Railroad Station, Pittsburg, erected in 1902, and the Baltimore Armoury, built in 1904. The former structure has a span of 255 ft., a height of 110 ft., and is of the three hinged type, the ends of the main ribs being connected by horizontal chords. The latter has a span of 199 ft., and is of the two-hinged type, with horizontal ties between the ends of the main ribs.

It is interesting to note that when the ribs of a roof such as these are adequately tied the whole construction really constitutes a bowstring girder of gigantic proportions, and when applied to a railway station the public are actually inside the girders and walk with perfect safety upon the bottom chords, which rest upon solid ground, instead of being at the mercy of girders mounted high above their heads on the top of lofty walls, as in stations of the Charing Cross and some other types.

St. Enoch's Station, Glasgow, with a span of 198 ft., and the Central Station, Manchester, with a span of 210 ft., are fine examples of similar construction, except that they are built as genuine arches in which the thrust is resisted entirely by the abutments.

While referring to arched roofs of wide span, the roof of Olympia, London, should be mentioned as the finest example of the type in which the main arch, with the span of 170 ft., and two side arches, each of 40 ft. span, are connected, so that the whole forms a compound structure. This roof was built in 1887 from the designs of Mr. A. T. Walmisley and Mr. Maxim Ende as joint engineers.

The manner in which the horizontal thrust of the arch and the horizontal wind pressure are taken up is distinctly novel. The whole of the gallery on each side acts as an abutment, and, as the columns are fitted with ball and socket joints at top and bottom, these members are always under axial load whatever may be the wind pressure or the irregularity of the gallery-loads.

Arched roofs, such as those mentioned above, certainly represent the safest forms of construction for long span roofs, because their stability does not depend upon the strength of single tie-bars or even upon ties in duplicate. They afford ample space for traffic without intermediate supports, and the chief objection to their employment is the heavy cost involved in construction.

#### Roofs of Composite Type.

To secure unobstructed space in railway stations at the lowest possible cost is a problem that has exercised engineers for many years past. One of the most successful attempts in this direction was made more than forty years ago by Mr. Jacob Hood, when designing the roof of the Victoria



Terminus of the London, Brighton and South Coast Railway, where continuous girders, extending from side to side of the station, with one line of intermediate columns, support small roof trusses of the queen-roof type. The use of girders in this manner makes it possible to place the supporting columns wherever they may be least inconvenient and most free from the risk of injury from derailed rolling stock.

Two stations in Glasgow are spanned in a somewhat similar manner by deep latticed girders, the more remarkable of these being the Central Station, where the transverse girders are 213 ft. long by 20 ft. deep, and carry ten ridge and furrow roofs of 35 ft. span. Apart from their other advantages, roofs of this character do not involve great risks, for the failure of the tie-bar or any other member in one principal of a small span would not be followed by serious consequences, and possibly would not even cause the failure of the truss affected.

#### Recent Types of Roof Design.

Indications are not wanting in the present day that the fashion for monumental roofs is distinctly on the wane so far as railway stations are concerned. In several of the most recent designs for such roofs small spans have been adopted, and it is probable that the tendency to reduce initial expenditure, and the disadvantages of huge spans, will finally lead to the practice of simply covering the station platforms, leaving openings above the lines for the free escape of steam and other destructive gases from locomotive engines.

The roof of Marylebone Station, London, is a good example of modern steel construction. The platforms, lines, and promenade are covered with light steel roofing, carried by built-up stanchions and arched girders of the Linville type. The total width of the roof is 155 ft., made up of one 40-ft. trussed span, two 50-ft. trusses spans, and a 15-ft. cantilever span. This roof is of unpretentious character, and, owing to the elegance of its construction, and the absence of high side walls, the station is one of the most cheerful and best lighted in the metropolis.

The new roof under construction in connection with the extensive widening operations at Victoria Station (L. B. and S. C. R.), London, is an admirable illustration of sound engineering design, complying alike with the requirements of traffic and the safety of the public. The total width covered from Buckingham Palace Road to the South Eastern and Chatham Railway, is about 320 ft., and, as shown by the section in Plate II., the roof is divided into five spans of varying width and height. The main principals are spaced 16 ft. 8 in. apart, every third principal is carried on one of a series of cast-iron columns, spaced 50 ft. apart, and the others on latticed girders connecting the columns, the latter being arranged along the centre lines of the platforms where they are safe from accidental injury. The following are typical dimensions of the chief members of the roof trusses:—The main rafters are formed of two 18-in. by 3-in. channel-bars; the main tie-bar consists of two 6-in. by 3-in. T-bars in each end length, and two 4½-in. by ½-in. flat bars in the centre length. In the bracing, the struts consist of channel and angle-bars of different dimensions, single or duplicate, according to position; the ties are flat bars of different dimensions, single or duplicate, according to positions; and the vertical tie in the centre is a 1¼-in. diameter eye-bar, provided with a screwed turn-buckle for purposes of adjustment. This roof is being erected from the designs of Mr. Charles L. Morgan, M.Inst. C.E., to whom the author is indebted for the foregoing particulars and the drawing included in Plate II.

A design presenting features of decided novelty is that prepared for the Marine Station, Dover, in connection with the proposed widening of the Admiralty Pier to provide adequate accommodation for the increasing continental traffic of the port. The station is to be 800 ft. long by 200 ft. wide, and particulars of the roof are shown in Plate II. Three rows of cast-iron columns, spaced 26 ft. apart, centre to centre, carry the roof structure, the outer rows of each supporting one end of the transverse lattice girders with the span of 100 ft., which meet at the centre row of columns placed in the middle of a platform 60 ft. wide. These girders are 10 ft. deep, and are divided by vertical struts into panels 10 ft. wide, having a double system of diagonal ties, the height from rail level to the under side of the girders, the headway being 20 ft. The columns are continued above the bearings of the girders and incorporated into the iron-work of the double cantilever roof principals, which form 25-ft. roof span, and somewhat resemble the cantilevers of the North Bridge in outline, but differ in point of detail. The cantilever arms extend 12 ft. 6 ins., and their ends carry the roof gutters, which discharge through the centre row of cast-iron columns. One side of each roof ridge is covered with sheet copper laid over felt and boarding, and the other side is glazed. All the purlins are of timber, a ma-

terial selected instead of iron owing to its immunity from injury by the steam and gases emitted from locomotives, and for the same reason wrought-iron has been specified instead of mild steel for the roof work generally. The new Marine Station was designed for the Dover Harbour Board by Mr. A. T. Walmisley, M.Inst. C.E., by whom particulars and drawings have been furnished for the purposes of his paper.

The three types of design described above are sufficient to demonstrate the reaction that has set in against roof spans of exceedingly large proportions, and the drawings for the new station at Charing Cross serve to emphasise the same characteristic.

On the recommendation of Mr. Percy Tempest, and their consulting engineers, the railway company decided in December last to remove the existing Charing Cross roof and to substitute a new roof of modern type at a lower level. The work of demolition by the aid of travelling stages fitted with powerful cranes has been in progress for some weeks, and is now nearing completion. The new roof is designed on the ridge and furrow system, the ridges running at right angles across the station. The principals will be carried by latticed girders extending from side to side of the station, and these girders will be supported by the lowered side walls, and by two lines of columns placed in the middle of the platforms. The total height of the roof will not be more than about 35 ft. to 40 ft. above rail level, and as the side wall will be considerably reduced in height abundant provision will be made for the admission of light, to say nothing of the other manifest advantages of the new structure. Mr. Tempest's reason for adopting this type of design was that it will be possible to construct the transverse girders in such a way that the columns may be moved within reasonable limits to suit any re-arrangement of the platforms that may become necessary, and thus to save any alteration to the structure of the roof in case widenings should be undertaken on either side of the present station. At the same time the new roof will conduce to the safety of the public and give increased facilities for maintenance, for the direct escape of steam and corrosive gases, and for the dispersion of sound waves.

#### Preservation of Iron and Steel.

In conclusion, the author desires to point to the fact that, however much the design of iron and steel roofs may be improved, the question of corrosion will always have to be faced. No form of paint or kindred protective coating has been discovered that will effectively shield metal from the chemical action taking place in the presence of oxygen, moisture, and acid. Exhaustive investigations, conducted by the Pennsylvania Railroad Company upon some fifty different preparations, including forms of asphaltum, india-rubber, graphite, carbon, lead and iron oxide paints, have proved that not one of these could preserve steelwork from rust for more than twelve months.\*

These investigations also confirmed the facts that no known form of paint is impervious to air, and that in the case of steel-work exposed to smoke and gases, corrosion commences behind the paint and not from the front after disintegration of the surface. It may be mentioned that ample evidence of the latter effect was furnished by the fallen iron work at Charing Cross Station.

The proposal has recently been made by Mr. B. H. Thwaite that the application of Dr. Angus Smith's compound would effectually protect iron and steel from the effects of corrosion. As water pipes coated with this material are not immune from attack, especially by water containing vegetable acids, it is somewhat doubtful whether metal under far more disadvantageous conditions would fare any better.

Sir Benjamin Baker has recently stated the difficulty of this point very clearly, saying that the trouble in railway stations arises from the gases emitted by engines, and the impossibility of getting paint to stick on. He added that no material had yet been invented to protect iron, so as to enable it to resist the corrosive action of the atmosphere.

Nevertheless, it is a well known fact that Portland cement of good quality, properly applied, is an absolute and the only efficient preservative for iron and steel. This points clearly to the advantages to be derived from the employment of concrete-steel, especially in railway station roofs. The material in question has been used in the United States for the construction of roof principals in spans up to 100 ft., and in this country for arched beams up to 54 ft. span. Hence it is perfectly clear that railway station roofs together with their supporting columns, could easily be built of the reinforced concrete which, as demonstrated by numerous examples of bridge construction, lends itself to light and

\* Proc. Am. Soc. for Testing Material. 1905.

elegant types of design, capable of enduring for centuries with practically no attention or expense in the way of maintenance.

This is the final point suggested to the author by the Charing Cross roof, not by the failure, but by the corroded condition of the fallen ironwork which, although not worse than that of many other similar structures, was sufficiently marked to constitute a powerful argument in favour of a material of construction that is unaffected by climatic and other corrosive influences.

**Cork.**—The new buildings of the Incorporated Church of Ireland Cork Young Men's Association have been declared open. The designing of the structure was entrusted to Messrs. W. H. Hill & Son, architects, and they discharged their task with skill and taste. The former home of the organisation occupied an area of 90 feet by 30 feet; by taking in some out-offices to the rear, which had been rented for business purposes, the depth of the ground available was increased to 158 feet, and the manner in which this circumscribed space has been utilised is quite a revelation of the possibilities of architectural science. The South Mall facade has been treated in modern free classic style, a striking feature being made of the reading-room bay window, which is upon the first floor level, and is rich in chaste ornamentation. The central portion of it projects as an oriel. The base, which is fan-shaped, has been beautifully modelled in plaster, the handsome Renaissance design being a splendid example of this type of work in bas relief. On a band surrounding the base, in clearly defined letters, are the words, "Church of Ireland Young Men's Association, Incorporated 1903." In the treatment of the front generally there has been an effective combination of pebble dashing and smooth cement, the latter being employed chiefly for architraves, pilasters, and cornices. The pilasters, which are rusticated, terminate in handsome finials above the parapet, and contribute a pleasing break in the sky line. Upon each side of the facade at the ground level there are two striking doorways, that at the eastern side being the main entrance to the institution. Over this there projects a semi-circular hood, supported at either side upon two massive classic columns, which in turn rest upon moulded plinth walls. The vestibule is panelled in pine, and decorated in cream enamel. The pair of swing doors which give access to the hall are glazed with lead glass, after l'art nouveau, between the interior and the outer world. The hall itself is neatly tiled and of good width. An apartment twenty-four feet long by sixteen feet wide has been formed out of the northern end of the former reading-room, and has a lofty ceiling. The Gregg Hall, both in design and construction, is splendidly adapted for the purposes which it is intended to serve. It is 53 feet long by 30 feet wide, and the stage situate at the northern end gives an additional length of 17 feet. The height is 25 feet, and the graceful coved ceiling enhances the lofty effect which has been secured. There is seating accommodation for close upon 400 people, and around the sides there runs a pine dado, 5 feet high, surmounted by a border of a warm hue. The hall is extremely accessible and safe, as it is on the ground floor, approached by a wide passage, and provided with two emergency exits on Grafton-street. It is splendidly lit by six lofty windows, piercing at intervals the western side of the hall, while artificial illumination of a high order is given by eight Nernst electric lamps. Heating has been effected by means of a hot-water system, including six radiators, and it may be remarked at once that no detail that would tend to the comfort of those frequenting the hall has been omitted. The stage, which is 3 feet above the level of the room, is attained by a neat staircase at either side, and behind there is an apartment which will serve the dual purpose of a dressing-room for the gymnasts, and a retiring-room for speakers and performers upon public occasions. The room has been fitted with two bath-rooms, and the usual sanitary accommodation. Leading off the central lobby are the lavatories, which have been fitted on up-to-date and approved principles, the floor being tiled throughout. Immediately adjoining is a passage way, 4 feet wide, and, if in future it is found necessary to erect a gallery over the southern end of the Gregg Hall, this passage will give access to it at the proper level. Northward from the centre lobby, on the left hand side, there is a suite of three rooms. They are 22 feet by 13 feet each. Two of them have been allocated to classes, and the third is the office of the secretary to the Diocesan Council. At the end of the corridor is the Council Chamber, extending across the full width of this wing. Its dimensions are 30 feet long by 22 feet broad. This apartment has a lofty coved ceiling, and the handsome Carrara marble mantelpiece has been preserved from the old building, as it is believed to have been designed by Hogan, the eminent Cork sculptor. The Graves' Library and the main reading room—the latter 30 feet long by 22 feet wide—overlooks the South Mall, and has the beautiful oriel window already referred to. On the upper floor is situated the caretaker's flat, containing four rooms, a kitchen, scullery, and bathroom. On the

front of the ground floor, and approached by an imposing private entrance, a suite of offices has been provided, and these will, in due course, be rented, with a view to supplementing the revenue of the Association. The contract for the building was entrusted to Messrs. E. and P. O'Flynn, and it is conceded on all hands that they have executed the work in their usual efficient manner. The original estimate was for the sum of £3,160, but extras which have from time to time been decided upon have brought the cost of the building to £3,600. The building has been electrically lighted throughout by the Cork Electric Lighting Co., and the fireplaces were supplied by the Cork Timber and Iron Co. and Mr. Hobson, Fish-street, while the plumbing work was entrusted to Messrs. Fullwood, of Marlboro'-street.

#### OUR ILLUSTRATIONS.

##### The New Carnegie Free Library and Museum, Limerick.

The new Carnegie Free Library and Museum at Limerick, the foundation stone of which was laid by Mr. Andrew Carnegie some time ago, is now almost completed.

The building is carried out in local limestone, the walling in hammer-dressed uncoursed rubble, with dressings of lighter coloured stone fine chiselled.

The porch is built throughout in dressed stone, the cornice being carved with interlacing work, and the entrance door is enclosed by semicircular arches in three orders springing from engaged columns, the caps of which are covered with interlacing ornament and conventional animals, inspired by ancient Irish work.

The roof is covered throughout with Killaloe slates, and is surmounted with all copper ventilating flûtes.

The library, which occupies the whole ground floor, contains a new room for 80 readers, 53 ft. x 25 ft.; a landing library for 20,000 vols, 35 ft. 9 in. x 19 ft.; a reference room, 18 ft. x 23 ft. 6 in.; ladies room, 34 ft. x 19 ft.; and all grouped round a central public space and issuing department lighted from above, giving complete supervision over all departments, the dimensions being 22 ft. x 33 ft.

The upper floor contains a museum 53 ft. x 25 ft., with open timber roof, a museum store, committee room, two rooms for caretaker, and an extra book store communicating with the lending library.

A box room, heating chamber, coal store, and lavatory for library assistants are provided in the basement.

The curator's house adjoins the library, and contains two sitting rooms, kitchen, etc., and bedrooms and bath, etc.

The work has been carried out from the designs and under the superintendence of Mr. Geo. P. Sheridan, A.R.I.B.A., 25 Suffolk-street, Dublin.

The contractor for the building is Mr. James P. Pile, of Lower Erne-street, Dublin, who has carried out the work in a very satisfactory manner.

The contract for the heating is in the hands of Messrs. Maguire and Gatchell, of Dawson-street, Dublin, the electric lighting is being carried out by Messrs. Wm. Coates and Son, of Belfast and Dublin, and the furniture and fittings contract has been placed with Messrs. Alesbury Bros., of Edenderry, King's County.

The total cost of the work, including heating, furnishing, lighting, etc., is covered by the amount of Mr. Carnegie's gift of £7,000.

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## TWO IMPORTANT MEASURES.

Two measures of great importance to all concerned with the building and engineering trades have recently passed their first reading in the House of Commons, and may, therefore, be expected, subject to amendment in Committee, to be shortly placed upon the Statute Book. The one is "The Trades Disputes Bill," and the other the absurdly named "Prevention of Corruption" Bill. The former Bill is a notable measure, marking an era in British legislation, and may be described as the first fruits of the democratic labour victory at the polls. It is further remarkable, in that it supersedes, with startling rapidity, and emphatic force, an abortive measure on the same lines introduced by a Government generally conceded to be most sympathetically-disposed towards the labour party, which, indeed, it includes amongst its own political forces. The main object, both the measure introduced by the Government and that which now replaces it, was the nullifying of the famous "Taff Vale" decision. That judgment of the courts in a suit brought by the Taff Vale Railway Company, for damages sustained through the action of members of a railway employees trades union, was briefly to the effect that such damages could be recovered against a union, and the general funds of that body attached to satisfy the judgment of Court. This decision at once struck a heavy blow at prevailing methods of combination in carrying out strikes, in particular in regard to the practice of picketing. The moral or equitable aspect of the case seems

never to have been so much as thought of in the subsequent efforts made by trade unionists to have the law as thus laid down amended. The whole question seems to have been argued simply as one of expediency and of might and power. Plainly, it seems the very elementary principle of equity that if irresponsible and unauthorised members of a trades union cause damage and hurt to an employer, then that the employer should be able to attach the accumulated funds and savings of the general body to satisfy his claims would be reducing the law in that respect to the level of the strangely illogical, though, possibly, effective law of compensation for malicious injury, which compensates the sufferer at the hands of the individual criminal, at the expense of the whole community. With an enactment clearly setting forth principles of equity and safeguarding the union funds from unjust attachment, no reasonable person would quarrel; but it is monstrous tyranny that a trades union executive may officially support and endorse every act of intimidation on the part of its members and yet be absolutely indemnified from all responsibility. This is practically what the Bill amounts to, and it was upon this crux that the Government and the labour party really split; the Government measure having sought to enact that where an executive duly authorises acts on the part of its members resulting in loss and damage to others, then such acts might be made the subject of an action for damages. The matter stands that, so far, and subject to whatever action the House of Lords may take, the unions have had their way. It is improbable that the Lords will venture on any serious opposition to the wishes of such a vast majority as supported the Labour Bill in the Commons, and it is a serious matter for employers. There can be no doubt but that the power of labour nowadays is a force that has come to stay, and will not be gainsaid. The chief trust of those adversely affected by such legislation must be first of all in effective combination for self-defence and more unselfish mutual support amongst employers; and, secondly, in the hope, we venture to say well founded, that the spread of education amongst the working classes and the growth of a broader and more tolerant spirit on both sides, may result in a wise and moderate use being made of the vast powers that the unions now possess, and that such things as prevailed years ago amongst the Sheffield Knife Grinders' Union, so graphically described by Charles Read, are now impossible.

The other principal enactment of the Trades Disputes Bill relates to picketing, and important as it is, it is of minor importance to the clauses we have just dealt with. When this measure becomes law, it will be perfectly legal for individuals, acting together or in large bodies, on their own behalf or on behalf of their trades unions, to attend at works for the purpose of "obtaining or giving information," or of "persuading any person to work or to abstain from working." The degree of "persuasion," or the manner of emphasising it, is not set forth.

The other measure, to which we have made special reference, the Prevention of Corruption Bill, deals with the dishonest giving or receiving of money or other valuable consideration to agents, with a view to enable them to make a private profit unknown to the principal. It also deals with bogus receipts. The Bill, said the English Solicitor-General, who moved the second reading on Tuesday night, was much simpler than that introduced by the late Lord Russell, which attempted to classify the acts which would be dealt with as misdemeanours, and it provided that the action must be found to be dishonest before it came within the scope of the Bill.

We are glad that in the interest of honest and open dealing, the Government have taken up this question, which, for a long time past, has called for vigorous attention. Here in Ireland the architectural and engineering professions, and building and allied trades, have been singularly free from any imputation of illicit commissions, though there have not been wanting instances of very glaring corruption, long continued, open and flagrant. It is needless to argue nowadays the hopeless dishonesty

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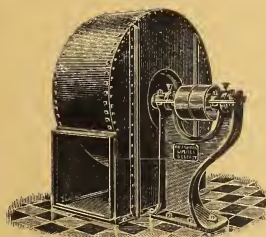
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of the man who, in the position of architect or engineer, sole guardian of the employer's interests, accepts, at the hands of contractors or manufacturers, monetary or other valuable consideration of any kind, for there must inevitably follow the *quid pro quo*, which means the betrayal of the client's interest. It is difficult to draw the line of difference between valuable consideration and a merely trivial token of courtesy at a festive season, or the like; and for that reason he is a wise man who, if he can manage to do so without giving offence where none is intended, abstains from accepting even the smallest gift.

We have not the full provisions of the measure before us, but in the course of the discussion in the House of Commons Lord Balcarras pointed out that the Bill imposed fines of £500 or two years' imprisonment for "showing, or forbearing to show, favour or disfavour." He thought the language was too wide. There would be a danger of innocent persons being proceeded against, and advantage would be taken of the Bill to levy blackmail.

On the other hand, there is a clause which provides that proceedings under the Bill cannot be instituted without the consent of the Attorney-General, which, we presume, means that he must be satisfied that there is *prima facie* evidence of fraudulent interest, and a very wise precaution we think. With the general principle of the measure, which passed the second reading without a division, no honest man will quarrel.

## COMMENTS.

### Important Report of the Registration Committee of the Institute of British Architects

As our readers are doubtless aware, a committee of the Royal Institute of British Architects, which included both opponents and advocates of the principle of statutory registration, was appointed many months ago, and has since had under consideration this question, which is of such vital interest to the whole profession. The history of the movement in favour of registration and the previous opposition of the Institute thereto, is so lengthy and has so often been discussed in these columns that it is needless to go over the old ground. The committee has now formulated its report, which is about to be submitted to a general meeting of the Institute, and it is as follows:—

To the Royal Institute of British Architects—

The Committee have the honour to report that a Subcommittee have held fifteen sittings, and have heard the evidence and views of twenty-four architects from various parts of England, Ireland, and Scotland.

As a result of their deliberations the Committee is impressed with the desire of many architects (especially those who are practising in the provinces) that a legal status should be given to duly qualified practitioners in architecture, and they are of opinion that this can be met by applying to Parliament for a legal diploma of membership of the Royal Institute of British Architects, it being made compulsory that after (say) 1912 all architects, before receiving this diploma, must have passed through a definite course of architectural education in a recognised school.

The Committee believe that in a short time if this were done the holding of such a diploma would prove to be of professional value to all practising architects.

It is generally admitted by the advocates of the present draft Bill that the only chance of getting Parliamentary powers to carry out such a penalising proposal as the registration of the title of architect would be (1) by placing the registration in the hands of a board partly composed of members outside the Institute, though it is suggested that the Institute should be largely represented upon it; and (2) by exempting from its operations all the members of the Institutions of Surveyors and Civil Engineers. It is also generally admitted that the standard for admission to such registration would have to be a low one.

The Committee believe that unless the profession can approach Parliament with approximate unanimity there is little chance, in the present state of public business in the House of Commons of getting any contentious measure passed.

The Committee therefore recommend that at present

the Institute should confine itself to attempting to obtain Parliamentary recognition for its membership, an attempt which, they believe, would meet with very general support. Such State recognition would encourage education and raise the qualifications of architects, and would at the same time avoid the temporary necessity of granting a statutory title to unqualified men.

The Committee recommend that the title of the Institute be changed to that of "The Royal College of Architects," and that a temporary third class of professional members be established.

As an appendix to this Report the Committee submit an outline of suggestions to give effect to the recommendations herein contained.

The Committee beg leave to state that this Report has been adopted by them unanimously at a meeting on March 20, 1906, at which the following members were present:—

Edwin T. Hall (Vice-President), in the chair; R. S. Balfour, W. H. Atkin Berry, A. W. Brewill (Nottingham); J. J. Burnet (Glasgow), J. T. Cackett (Newcastle); W. D. Caroe, T. E. Colcutt, A. W. S. Cross, E. Guy Dawber, E. M. Gibbs (Sheffield), W. J. Gilliland (Belfast), J. S. Gibson, Alexander Graham, E. A. Gruning, G. H. Oadley (Bristol), George Hubbard, H. V. Lanchester, A. N. Prentice, G. H. Fellows-Pryne, John. W. Simpson, John Slater, Leonard Stokes (Vice-President), C. Harrison Townsend, Paul Waterhouse, Sir Aston Webb, Edmund Woodthorpe.

The President, whose absence through illness was deeply regretted, together with Mr. H. T. Hare, Vice-President, and Mr. J. A. Gotch, who were unavoidably prevented from attending, have desired their names to be added to those appearing.

By order of the Registration Committee.

W. J. LOCKE (Secretary).

Appendix to the Report: Heads of Scheme for Raising Qualification of Architects.

(1) Revise the Charter, and (2) submit a Bill to Parliament.

Charter Revision.

(a) Change name of Royal College of Architects, and the affixes F.R.I.B.A. and A.R.I.B.A. to F.R.C.A. and A.R.C.A.

(b) Substantive provision—In future Fellows to be elected (1) after 1906 from those who have passed the Associates' Examination; or (2) by Council in special cases.

(c) To authorise the constitution of a scheme of education to be compulsory on all candidates coming up for examination after 1912.

(d) Create new subscribing class for temporary duration, without the power of voting, to be called Licentiates (L.R.C.A.), at a low fee, to admit bona-fide architects who are not eligible for F. or A.R.C.A.

All members of allied or other societies of architects, found eligible by the Council of the R.C.A., to be admitted as Licentiates without election. Admission to class to be closed within a year after the passing of the Act.

All to sign declaration and obligation as to professional conduct.

(e) F., A., and L. to be defined as professional members.

(f) Disciplinary powers to be increased with power of appeal.

Bill to Parliament.

Declare it is in public interest that employers should be enabled to distinguish between architects recognised as qualified by a competent authority and those not so recognised.

Enact

(a) Following the precedent of the Law Society, the Royal College of Architects (already recognised by Parliament as authority for granting certificates required by district surveyors before they can receive appointments) be empowered and required, by its Council, to institute and supervise education and examination of architects for admission to the R.C.A., and to confer the titles F.R.C.A. and A.R.C.A.

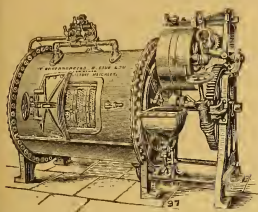
Confirming all such present titles.

(b) Give statutory force to present charters.

(c) Legalise scale of charges, to be approved by Privy Council for all professional members of R.C.A.

(d) Municipalities and other public bodies acting in fiduciary position shall on the erection or alteration of buildings in cities or towns employ a professional member of the R.C.A.

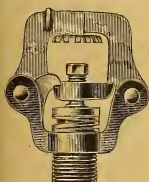
(N.B.—It is a question if clause (d) should be introduced, but it is likely to commend itself to Parliament, and it follows a policy long supported by the Council and by a large number of the members of the Institute. At the worst it could be struck out of the Bill.)



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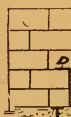
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Memorandum to be Considered at the General Meeting.

In accordance with a resolution of the Registration Committee the President appointed in October last a Sub-Committee on the one side, and Messrs. J. S. Gibson, A. W. S. Emerson, Sir Aston Webb, J. Slater and T. E. Colcutt on the other side, and Messrs. J. S. Gibson, A. W. S. Cross, W. H. Seth-Smith, and George Hubbard on the other side, with the President as Chairman. Subsequently, owing to Sir Wm. Emerson's absence in India, Mr. E. T. Hall was nominated by the President to take his place, and the President's selection was subsequently confirmed by the Registration Committee.

At the first meeting of the Sub-Committee, on October 25, 1905, the following procedure was agreed upon—viz., to summon twenty-four witnesses, comprising six metropolitan and six provincial architects in favour of registration, and a similar number of metropolitan and provincial architects holding the opposite view, the witnesses to be summoned to give their personal opinion on the question.

The first meeting for the examination of witnesses was held on November 22, and eleven subsequent meetings were held, when the following twenty-four gentlemen were good enough to attend and express their opinions before the Committee. Those in favour were Messrs. W. Gillbee Scott, H. A. Saul, Lewis Solomon, Ellis Marsland (Hon. Secretary, Society of Architects), H. W. Wills, F. R. Farrow, H. L. Goddard (Leicester), S. Perkins Pick (Leicester), H. Smith (Bristol), W. J. Gilliland (Belfast), J. W. Beaumont (Manchester), John Keppie (Glasgow); and against them Messrs. I. Macvicar Anderson, Professor Beresford Pite, Reginald Blomfield, A.R.A.; Basil Champneys, H. H. Statham, T. G. Jackson, R.A.; C. Hadfield (Sheffield), Professor Capper (Manchester), J. J. Burnet (Glasgow), J. A. Go'ch (Kettering), W. M. Fawcett (Cambridge), and Professor C. H. Reilly (Liverpool).

A shorthand writer was present throughout the proceedings to take the evidence on record.

The Sub-Committee then proceeded to consider its Report of the Registration Committee. The general effect of the evidence may be briefly summed up as follows:—On the one hand it was strongly felt by the witnesses in favour of registration that the standard of architecture ability would be raised by instituting compulsory training and examination; and also it was thought that, in the interest alike of the public and the profession, only those examination should be legally entitled to call themselves who had proved their competence by passing a qualifying architects.

"On the other hand there was an equally strong feeling that the measure proposed would have a tendency to lower the art of architecture, and that, as the test to be applied must, in the opinion of many, be a low one, there would inevitably be a tendency to register very poorly qualified men; and that, though examinations might fairly test a man's constructive knowledge, they could not fix a standard in art.

"It seemed obvious that with these strongly conflicting views there would be the greatest possible difficulty in obtaining Parliamentary sanction to the measure proposed, and the Sub-Committee, after due deliberation, therefore unanimously agreed to the terms of the Report, which was subsequently submitted to and approved at a well-attended meeting of the full Registration Committee held on the 20th inst. It was considered that, amongst the incidental advantages to be obtained by these proposals, and in addition to those mentioned in the Sub-Committee's Report, (a) it would ensure legal recognition of the Institute's scale of charges; (b) it would enable the Institute to deal more effectually with cases of dishonourable professional practice; (c) and it would be likely to meet with the fairly unanimous support of the whole body of the Institute."

The report and the recommendations it contains are plainly the result of a compromise, and like all compromises fails to thoroughly satisfy anybody; the changes proposed will be utterly ineffectual in combatting the evils which the advocates of registration claimed that a Registration Bill would, to some extent at least, accomplish, especially in the country districts.

The question of registration was referred to the committee, but they have, practically speaking, made no pronouncement thereon, but have rather formulated recommendations for raising the status of the British Institute.

The educational suggestions of the committee, that all architects before being admitted to membership shall after 1912 undergo a prescribed course of training, we are in entire agreement with. The suggested provisions for the admission of different classes of members after the pre-

sent year are, we think, invidious and highly objectionable. It is proposed to enact that after 1906 fellows shall be chosen, *a*, from the associate class; *b*, elected "by the Council in special cases." What this latter provision means there is no indication of. The present system of election is supposed to be only applied "in special cases." The creation of a special and inferior class of "licentiates" "at a low fee" and "without power of voting" is not satisfactory. Still less so is the provision that those outside the ranks of the Institute who do not qualify by examination must take their places, no matter what their standing, in the licentiate class within 12 months from the passing of the measure, or be for ever shut out from obtaining a legal status as architects; moreover it is not clear whether if a man decides not to accept this badge of inferiority, he will be able to recover his fees in court as an architect or not. Now, the creation of this class of licentiates is obviously a concession to the clamour of the associates who have gained their status by examination. With their view, that it is injustice to them who have had to undergo a severe examination that men who possibly have never studied at all, should be elected, over their heads, as it were, to fellowships, we have the fullest sympathy, and we think their opinion should be studied and met in some fashion. The difficulty has arisen in this way: for a couple of years past the Council has been pretty freely electing men in large numbers to the fellowship, many, it is alleged, being possessed of but slender qualifications. This went on until a month or so ago, when the associates called for a ballot, and "black-balled" almost every candidate put forward by the Council; and without any discrimination. This was certainly a very effective, not to say violent, expression of their views, and we venture to say will serve neither the interests of the Institute nor the proposed measure. The chief objection to the creation of the licentiate class bearing the stamp of inferiority arises out of foregoing facts, and is this: The Council having been engaged for the past two years in pretty readily electing men to the fellowship, including candidates from provincial towns and from Ireland, it would surely be an intolerable injustice that men of equal and possibly vastly better status and achievements, should be confronted with the alternative of either entering the licentiate class, or remaining without legal status. Take a town in which there are any number of architects, from two to say fifty or a hundred. "Mr. A." and "Mr. B.," who notoriously are incapable of designing with any degree of artistic success, have taken time by the forelock, went up for election during the past couple of years, and are now entitled to write "F.R.I.B.A." after their names, while their fellow-practitioners, "Mr. C." and "Mr. D." who have done meritorious work, and have a better local status, are to be relegated to the licentiate class! The thing is absurd, and will not work unless some very definite pronouncement is first made in regard to the fellowship. Obviously the case calls for a conference between representatives of the Council and the discontented associates, in order to ensure that respectable and properly qualified (according to the regulations) men recommended by the Council for election to fellowship shall not be exposed to the almost certainty of being black-balled. It is difficult to believe that some practical way out of the difficulty could not be found, and as the committee pertinently observe, unless there is "practical unanimity" the measure will have no chance of becoming law. As now framed, it is on lines extremely unfair to the members of such important bodies as the Royal Institute of Architects in Ireland and the Society of Architects, London, unless and until provision is made that for some limited period at least, the existing members of those bodies shall have ample opportunity, if duly qualified in accordance with the existing regulations for becoming elected as fellows, and, failing this, such members of other societies would be foolish to accept the lower grade of licentiate and would be better advised not to associate themselves with the Bill or with the British Institute. In other words, it is a case for guarantees and conferences with representatives of the other societies. It seems rather a pity that the Irish Institute was not directly re-



presented on the committee. The proposal to limit the rights of municipalities to the employment of members of the Institute, while, at the same time, a substantial body of practising architects were practically shut out therefrom would, of course, prove quite unworkable, unless election to the Institute were placed upon a better decided basis.

The Royal Institute of Architects in Ireland has, we understand, made a very vigorously worded protest against the proposals, and against the action of the British Institute in formulating such an important measure without consulting the Councils of the allied bodies.

#### The Districts Council Again.

A Northern correspondent sends us the following cutting from the "Northern Whig," with the remark that it is a pity that these liberal conditions should not be more widely known! The date for receipts of "tenders" is 14th inst., so that there is still plenty of time:—

#### DONAGHADEE URBAN DISTRICT. WATER AND SEWERAGE SCHEME

The Donaghadee Urban District Council invite tenders from competent Civil Engineers to take Levels, prepare Plans, Specifications, and Estimates for a proper Water and Sewerage Scheme for the Town of Donaghadee, all to be subject to the approval of the Local Government Board.

Applicants will please state whether they have ever carried out similar work; if so, give particulars, and enclose a copy of any testimonials they may have.

In naming terms it will be necessary to state price for preparation of plans, etc. (including attendance at Local Government Board Inquiry); also on what terms they would be prepared to supervise the carrying out of the work in the event of the scheme being proceeded with.

No remuneration of any description to be payable unless said approval is obtained from the Local Government Board.

Tenders, sealed and endorsed "Engineer," will be received by the undersigned up till 14th April, 1906, at noon.

The Council do not bind themselves to accept the lowest or any tender.

D. WALKER, Clerk to the Council.  
Council Office, Donaghadee.

The demand for competitive "tenders," for such purely professional work, is unhappily only too common in Ireland, and there seems to be little or no use railing against it, until the Councils become educated, or else learn by bitter experience that professional men (and the engineering and architectural callings, even in provincial Ireland, still preserve the semblance of a profession), who undersell their brethren are, as a rule, either "quacks" or incompetent, whose cheap labour will be dearly bought at any price. The "quack" will waste money, where the experienced and skilled man might save the ratepayers hundreds, possibly thousands, of pounds. The additional condition that no remuneration will be given for all the labour of preparing a complete working scheme in the minutest detail unless the sanction of the Local Government Board be obtained, is so obviously unfair as to need no comment. All engineers who have had experience of these matters know how tedious the process of getting designs passed by the Local Government Board sometimes is, and that plans have on occasion to be altered again and again before sanction is given, sometimes to comply with "red tape" or even the "fad" of some official; again, the Local Government Board and Council may come to loggerheads over some point of site, finance, or the like, and a deadlock ensue through no fault of the engineer. Yet he is to receive nothing for his skill and trouble! The Council would not dare to offer such terms to tradesmen—the immediate result would be such an outcry that the Council would be forced to capitulate; yet apparently they can freely do so to architects and engineers. It may be taken for granted that no self-respecting engineer will compete under such conditions. The pity of the whole thing is that there is a perfectly fair and legitimate form of competition by means of which Councils which did not care to entrust their work straight off to an engineer could readily obtain designs, namely, by adhering to the recognised scale of

fees and by employing a qualified engineer as assessor. They would thus get the best value for their money.

#### Another Example.

Another correspondent sends us the following cutting from a Drogheda paper:—

#### IMPORTANT TO DROGHEDA CONTRACTORS.

The following was read:—

Northern Assurance Buildings, 7 Westmoreland-St.,  
Dublin, March 6th, 1906.

DEAR SIR,—Now that there is a universal and growing demand for houses that will be light, well ventilated, and sanitary, for the very poor, who are, unfortunately, too numerous in our towns and villages, we have designed cottages which can be built in small terraces, and which provide one large living room, with good range and fixed dresser; two separate sleeping compartments, each supplied with a fixed wire mattress and frame; W.C. and covered wash-place. These houses can be built for about £60 per house; price will vary slightly according to the number and locality. These houses will provide everything that is absolutely necessary for health and comfort in homes for people who are only able to pay a very small sum per week. If your Council should wish to go into this matter we will provide you with full working plans and specification for a small sum per house which can be arranged if business should ensue. These cottages can be designed by our Mr. Mills, who has special opportunities of studying this question of the housing of the very poor in the Kingstown Urban District Council. We may add that we have every reason to be sure that loans will be easily obtained on our plans. Hoping to hear from you,

TOMLINSON and MILLS.

Alderman Elcock considered that an important letter. He thought it ought to be referred to the Leases Committee for consideration. If they could get houses built for £60 a piece it would be a great saving.

The suggestion was agreed to.

Comment on such a letter at this seems superfluous. A Council with a proper sense of public duty would have forthwith committed it to its proper receptacle, which our readers will have little difficulty in naming.

Mr. William Field recently addressed a question to the Chief Secretary, whether candidates for Surveyorships under the Board of Works must not be nominated before they can compete at the examination, and invited him to explain how it was that 18 out of 19 assistant surveyors were of the same religious belief. Mr. Bryce replied that it was a fact that candidates for examination must first be nominated by the Commissioners, and that the Board had no knowledge of the religious faith of the staff.

We believe that, as a matter of fact, Mr. Field has been misinformed in regard to the figures he quoted.

#### ANSWERS TO CORRESPONDENTS.

##### Light and Air.

P.H., DUBLIN.—We could not undertake to advise you on the facts, and as to your prospects of successfully resisting a motion for an injunction, or an action for damages, the matter involved several points of law and questions of fact which latter even we have not before us. You should consult a solicitor, and have recourse to an architect of experience who would furnish you with a report on the case. You will find a good many "light and air" cases reported in Crow's "Architects Law Reports" (London, A. Crow, 18 Great Prescot street, E.), but we doubt if you would be wise in attempting to personally deduce the law therefrom. The law of light and air is very involved, and no two cases are alike.

Speaking generally, and from the imperfect particulars before us, we should say, especially in the light of Coll's case, that an injunction would not be granted against you, that there is some interference with your neighbours' rights, and probably small damages and costs would be given against you. If you could settle the matter in a friendly fashion for a small sum it might be the wisest course.

##### Leaks in Roof Tiling.

A.H.—The defects are probably due to hasty workmanship, and want of care in sorting the straight and the bent or cambered tiles. Pointing in mastic cement is the only remedy we can suggest.

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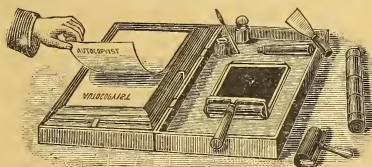
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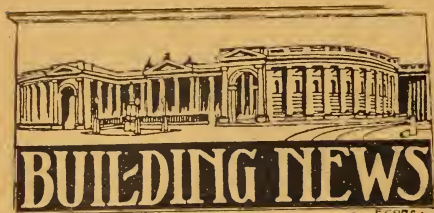
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**Ardara.**—Tenders are invited for renovating and enlarging Ardara church, including new roof, chancel, and vestry, in accordance with plans and specifications of Mr. R. Eccles Buchanan, C.E., Architect, Castle-street, Londonderry.

**Athlone.**—Tenders for building three houses in O'Connell-street for Denis O'Connell, Esq., T.C., will be received up to 10-h inst. P. J. Prendergast, A.M.I.C.E.

**Birr.**—The Board of Guardians will to-day consider applications from competent persons for the office of clerk of works in connection with the building of a dispensary residence at Ferbane.

**Borrisokane.**—News has been received in Borrisokane that £5,000 has been left to that town by the late Miss Clarke, of Macclesfield, England, to erect a memorial hall to the memory of her late father.

**Ballyshannon.**—A new Masonic Hall has just been erected at Ballyshannon. The hall is large, spacious, and imposing, the beautiful and well-furnished lodge-room being capable of seating comfortably a hundred people, while a much larger number could be accommodated in the reception-room.

**Bray.**—A new teacher's residence will shortly be built in connection with St. Paul's Church of Ireland Schools, Bray. The cost will be about £750.

**Cork.**—The Guardians of the Cork Union will, on the 12th April, receive tenders for alterations and repairs of Carrignavar Dispensary residence.

**Cootehill.**—Tenders have been received for removing old buildings and for erection of a new drapery shop and dwelling-house for Miss Adams, Main-street, Cootehill. J. F. McGahon, architect.

**Dublin.**—Four houses are to be built in South King-street, Dublin, for Miss Laird, of the Paris House, Dublin. Mr. Hampden Shaw, Westmoreland-street, is the architect.

The contract for building new stables at Temple Bar, Dublin, for Messrs. Simonds, brewers, Reading, has been let to Mr. Wm. Beckett, contractor. Messrs. Doolin, Butler, and Donnelly, Dublin, are the architects.

The Master of the Rolls has sanctioned the allocation of parochial funds to the building of the new church of St. Agatha, North William-street, upon the site originally selected, and upon which a church was begun some 40 years ago. Messrs. W. A. Byrne and Son, of Dublin, are the architects.

The Corporation will shortly be inviting tenders for an electrical sub-station, which is to be erected at Fairview in connection with the extension of the electric light by them to Clontarf. The quantities have been prepared by Mr. J. Mackey.

**PEMBROKE URBAN DISTRICT COUNCIL.**—The Pembroke Urban Council have received tenders for the erection of seven additional cottages, enclosing railings, and other works adjoining the Council's existing Artisans' Dwellings, Donnybrook.

The Church of Ireland Diocesan School for Girls, Adelaide-road, has been so successful that it has been found necessary to provide additional accommodation for the pupils who desire to attend, and arrangements have been made for commencing the enlargement of the school at an early date.

An influential meeting of ladies was held last week at the residence of Rev. John Kelly, P.P. of Sandford and Glencullen, for the purpose of inaugurating a bazaar with the object of establishing a fund for the erection of a new Roman Catholic church in the Sandford parish.

**NEW TECHNICAL SCHOOLS IN BOLTON-STREET.**—At the Corporation meeting on Monday last, amongst the reports for first reading was one from the Technical Education Committee in reference to the selection of an architect for the proposed new Technical Schools in Bolton-street, and asking for the suspension of the Standing Orders, with a view to seeking competitive designs for the building—(No. 47).

—The Lord Mayor put the motion for the first reading, and declared it carried.—Alderman Kelly: I beg to move the suspension of the Standing Orders.—The Lord Mayor said he had said, "Next business," and he would not hear Alderman Kelly.

—Alderman Kelly said he followed the usual course (hear, hear).—Alderman Bergin said that Alderman Kelly had undoubtedly followed the usual custom.—The Lord Mayor said if he had made an error he was not above admitting it, and he would therefore take the motion of Alderman Kelly.—Alderman R. O'Reilly seconded the motion.—For the suspension: Alderman

men Healy, Lyon, Cole, Kelly, Reigh, Cotton, G. O'Reilly; Councillors Joseph Doyle, Hatch, Crowe, Beggs, Dinnage, Ryan, Clear, Reynolds, Hutchinson, Cox, John Kelly, Parkinson, P. J. Rooney, O'Lehane, M. Walter, P. O'Reilly, T. Byrne, Daly, John Lawlor, John Doyle, Burke, Camac, Michael Doyle, P. O'Reilly, Johnston, James Byrne, and M. Keena—34. Against: Aldermen Coffey, Keegan, Farrell, Irwin, Bergin, Davin; Councillors T. Rooney, Carolan, Brady, Michael Cahill, M. Carthy, Vance, Sir Joseph Downes, Sherlock, James, Lord Mayor, Monk, Murray, O'Meara, Meade, M. Call, and Kennedy—21.—There not being the necessary two-thirds majority, the suspension of the Standing Orders was refused.

The directors of the Great Northern Railway are prepared to receive tenders for the construction and erection of a Motor Car Shed, 133 ft. long by 40 ft. wide, of galvanized corrugated iron, etc., with steel principals, at their Amiens-street Terminus, Dublin. Parties wishing to tender for the work can see the drawings and specification at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street Terminus, Dublin; or copies of them at the Office of the District Engineer, Belfast. Tenders should be delivered not later than the 30th inst.

**Drogheda.**—Tenders are invited for the erection of an hospital in Drogheda by the Drogheda Cottage Hospital Committee. Drawings and specifications may be inspected with the hon. secs., Greenhills, Drogheda, and copies obtained from Frederick Shaw, M.R.I.A.I., architect, St. Laurence-street, Drogheda. Sealed tenders to be lodged on 20th inst.

**Enniscorthy.**—Tenders will be received on 14th inst. for building seven houses in Lower Church-street and Friary Hill, Enniscorthy, for Mrs. White, Castle Hill. Plans and specification can be seen at the office of Mr. Edward S. O'Brien, B.E., and M.Inst.C.E.I., Weston House, The Westgate, Wexford.

**Irvinestown.**—Tenders will be received up to April 10th, inst., by Mr. George Chittick, Irvinestown, for the erection of six houses. Thomas Elliott, architect.

**Moir.**—The Rural District Council require the services of an architect in connection with a proposed scheme for the erection of fifty labourers' cottages, and invite applications from qualified persons prepared to undertake the duties of the position. Applications will be received up to the 19th inst. William J. Corner, Clerk of the Council, Lurgan.

**Moynalty.**—Tenders are invited for the erection of a chancel and heating chamber in connection with Moynalty chapel. Plans and specifications may be seen at the parochial house. Rev. John Brogan, P.P., Moynalty, Kells, Meath.

**Strokestown.**—Tenders will be received for erection of dwelling-house and out-offices at Newtown, Strokestown, for Robert Mason.

**Timoleague.**—A largely attended meeting of the parishes of Timoleague and Clogh was held in Timoleague for the purpose of publicly acknowledging the generous and princely gift of £2,000 from Mr. John B. Manning, New York, towards the erection of a new church in Timoleague.

## A NEW SHADOWLESS INVERTED CLUSTER LAMP

We have lately received particulars of a new lamp for interior use. It consists of a cluster of inverted incandescent gas mantles, and is known as "The Brightway Inverted Cluster Lamp," and the manufacturers are Messrs. J. and W. B. Smith, 19-23 Farringdon-road, London, E.C. The special feature of the "Brightway" inverted cluster lamp is the way in which a cluster of three inverted mantles is suspended from an interior white enamelled plate, which distinguish it from any other lamp or burner. The three mantles are arranged so close together that they have the appearance of one large brilliant incandescent ball, giving a surprising effect of its lighting power. With a consumption of about 10 feet of gas per hour, at 15/10th pressure, we obtain a light of from 200-220 candle power, costing only about one-third of a penny per hour. The lamp is provided with a small interior by-pass, and can be lit by simply pulling down the chain.

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# ENGINEERING SECTION.

## ITEMS.

An interesting paper entitled "Millions in Irish Bogs" was read, at the last meeting of the Engineering and Scientific Association, by Mr. Thomas Rigley, before a large audience. In the course of his remarks the author gave weight to his contention that there was unlimited wealth contained in the bogs of this country, by mentioning some of the companies which are at present engaged in converting peat into a marketable commodity, upon which profit can be obtained. The Electro-Peat Company, which last year started work on a large scale near Athy, was quoted as one of the most successful of recent undertakings, the manufacture being entirely confined to peat briquettes. It is encouraging to find the subject considered by such an energetic body as this junior Engineering Association, and it is to be hoped that the attention of some of its members will be devoted to solving the problem of the economical conversion of peat into a more perfect form of fuel. The difficulty has its fascination, for its solution would be of such incalculable benefit to the country, and Monsignor Molloy's theory that electric lighting and power for the whole of Ireland could be obtained from the caloric conserved in the Bog of Allen would be so much nearer its realisation. At present a scheme of such magnitude appears utterly impracticable, but in the light of modern scientific advance it is only the unwise who will admit the impossible.

Within the last few weeks public attention has been again called to a vast engineering project which for many years has lain in abeyance, and which, with the North Channel and the English Channel tunnel schemes, has its term of desultory consideration, and then passes into the region of forgetfulness. There is at present a syndicate in negotiation with the Russian Government, whose object is to connect America and Asia by a railway tunnel under the Behring Straits, and it is stated that a capital of £54,000,000 can be commanded to carry out the work. The length of such tunnel between Kamschatka and Alaska would only be forty miles, or about equal to the distance between Larne and Stranraer, so that as far as can be seen there would be no insurmountable difficulties in the realisation of the plan, even if the construction of 5,000 miles of railway, to link up the Siberian and American lines, be taken into account. The scheme will appeal to the engineering mind by reason of its vastness, and to the sentiment of the public in that an overland journey could be taken from Paris to New York. But we doubt its practical value, and, in these days of turbine steamers and floating palaces, there are but few whose fears of *mal de mer* would drive them to undertake a railway journey of such length through barren and arctic regions. On such grounds it is hardly likely to be a dividend earning project.

Preliminary arrangements have already been made, at a public meeting in Cork under the presidency of the Lord Mayor, to welcome the Public Health Congress, which will hold its annual meeting in that city in June next. The chief concern is that of ways and means, but the warm-hearted hospitality of the Corkonians may be relied on to overcome such a difficulty—indeed, the subscriptions at the meeting proved that substantial aid would be forthcoming. Such congresses, while they lead to much reading of papers redolent of oil, and many discussions without much practical result, do, without doubt, create a stir in the centres in which they are held, and cause the public to give some consideration to the scientific principles and hygienic necessities of twentieth century existence. Cork has been fortunate in a Public Health Committee which, in recent years, has done much to draw up and enforce regulations and carry out reforms tending to improve the health of the citizens. Its Waterworks Committee would appear, after the unseemly wrangling and apparent mismanagement last year, to be settling down to its duties. But these municipal authorities and the public generally will doubtless learn much from and profit by the experiences and knowledge which will be set forth in the congress to be held in the Southern Capital, and it behoves every member of the community to use his utmost endeavour to make it as successful as possible.

A special meeting of the Waterford Corporation, under the presidency of the Mayor, recently resolved by 18 votes to 5 to consent to the obtaining, by the National Provincial Electricity Corporation, of powers for the purpose of installing electric light in the city. A provisional order is now pending before the Board of Trade, but the matter has formed the subject of much opposition in the past, as it was hoped to place the electric lighting scheme under municipal control. The opposition having now been withdrawn, the desirable improvement may be expected to be carried out without further delay.

The annual dinner and subsequent smoking concert of the Railway Benevolent Institution, held on March 20th, at the Dublin Rotunda, were, as usual, a complete success, and many well known engineers were to be seen in the almost overcrowded hall. There is a pleasant camaraderie amongst railway men which makes for thorough enjoyment at their social functions. The service to which the promoters of the concert belong was clearly evidenced by the decorations of signalling flags, red, green, and white, and by the electrical arrangements, which were executed by Messrs. Egan and Tatlev. The entertainment was provided by the Smart Set, a company of seven performers, and a more pleasing combination it would be difficult to discover. There were murmurs as to the undesirability of totally excluding local talent, but to most it was a change to listen to a programme which had the merit of novelty, and the unusual presence of the lady members of the company on a smoking concert platform added greatly to the zest of the performance. Be that as it may, a few minutes after eight it was a case of standing room only, and the chairman, Mr. F. W. Pim, of the Dublin, Wicklow, and Wexford Railway, whose health was drunk with the utmost enthusiasm, had every cause in his speech to congratulate the deserving Institution on the access to its funds which would accrue from such a large attendance.

"Concrete and Constructional Engineering" is a new bi-monthly periodical, the appearance of which is sufficient indication of the progress that concrete is making as a structural material, and the consideration it is obtaining from those who design and build. Its general adoption was tardy, and British engineers have lagged behind their Continental and American brethren in recognising the value of this material in their work. This is in great measure due to conservatism, and while such a characteristic is often derided by the hustling Yankee, it somewhat flatters our national pride to know that until anything novel is adopted on this side of the Atlantic its merits are not generally assured. Ferro-concrete construction is only beginning to make its way, but now that reliable literature on the subject is being issued there is little doubt that the more timorous practitioners will begin to study its advantages, and to adopt it under certain circumstances. We note also that the Royal Institute of British Architects has formed a joint committee to draw up rules for the guidance of architects in the use of reinforced concrete. The committee, which is presided over by Sir Henry Tanner, is made up of representatives of the R.I.B.A., the District Surveyors' Association, the Institute of Builders, the Incorporated Association of Municipal and County Engineers, and the War Office. The Science Standing Committee has already done so much good work that the report of this joint committee will be anticipated with much eagerness.

While on the subject of reinforced concrete, the particulars of what is said to be the highest concrete chimney in the world may be of interest, as indicating the possibilities of this material. The shaft has been erected at Butte, Mont. The inside diameter is 18 feet, and the total height 352 feet 7 inches. The foundation weighs upwards of 13,000 tons, and is formed of slag poured into an iron casing 100 feet square. The base, which is of reinforced concrete, is 42 ft. 6 in. square by 8 ft. 3 in. high. For the first 20 ft. in height the wall of the chimney is 18 inches thick, and above this it is composed of a double shell, consisting of a 5 inch inner and 9 inch outer wall, with a 4 inch air space between. The entire weight of the chimney, including the base and foundation, is 15,275 tons. The figures are somewhat startling, it is to be hoped that the results of such construction will not prove equally so.



Chicago is suffering from the results of the tunnelling operations carried on under the city, in the same fashion as it has been feared London will suffer if a period be not put to the subterranean works which are honeycombing the city. But the two cases are entirely dissimilar, for while in London the subsoil consists mainly of stiff clay, that of Chicago is for the greater part mud and alluvial deposit. Many of the streets have shown distinct signs of subsidence, and some of the most important buildings have fractured from foundation to roof owing to settlement. The chief fear is that the skyscrapers may suddenly collapse owing to the enormous and unanticipated strain to which the steelwork is being subjected.

Irish engineers, who have recently settled their own affairs in a business like and rapid manner with regard to the admission of new members to the Irish Institution, are able to look with some amusement on the hasty and ill-considered proposals that are from time to time put forward by architects for the betterment of their status, and the erection of a ring fence around their profession. We commented some months ago on the complete changes that from time to time take place in the personnel of the Council of the R.I.B.A. The result of the last variation has just been published in the report of a Registration Sub-Committee, the chief feature of which is a proposal to alter the title of the Royal Institute of British Architects to that of the Royal College of Architects. We call this the chief feature, because all the other suggestions are colourless, and are framed to meet both the wants of rabid registrationists and the antipathies of the architectural "Tory" party. The word "Mesopotamia" has been considered blessed, and it may be assumed that the committee have similar feelings as to the word "College," trusting that it will sooth all antagonisms and cause angry conflict to cease. The result may be readily anticipated; the profession that was divided against itself will now be sub-divided. We can but extend our sympathy to our architectural friends, who tell us that artistic yearnings and business capacity will not amalgamate, and who give the world convincing proof of their statement. We can further congratulate ourselves that we have business men at the head of the engineering profession both in Great Britain and Ireland, who, when they see a difficulty, grapple with and surmount it.

### SMOKE PREVENTION.

In every city and large town, the unhealthy conditions under which the occupants live by reason of overcrowding, want of fresh air, and lack of a proper quantity of sunlight, are seriously aggravated by the continuous outpouring of black smoke from the houses and factories, owing to the consumption of bituminous coal used for heating and power purposes. Under ordinary circumstances this pollution of the atmosphere is lowering to the vitality and, while leading to a high death rate, it also decreases the wage earning capacity of the individual, an important factor in the law of economics. In Ireland, owing to the scarcity of large industrial centres, the evil is not so apparent, more especially as the cities are in close proximity to the sea, and the air is for that reason kept more or less purified, but in England the subject of smoke prevention is receiving considerable attention from municipal engineers, especially in those cities where the products of combustion occasionally concentrate, and from what is known across the Channel as a black, or London fog. It is but recently a conference on smoke abatement was held at Westminster, and many valuable papers were read and discussions followed on this important factor of civic life. Amongst them was a paper by Mr. Arthur J. Martin, Assoc. M.Inst.C.E., containing many statistics which proved of interest to his audience, and some suggestions which commend themselves to the serious consideration of all those concerned in the question of public health. Instancing the damage caused by a fog in London, the author stated that the immediate consequence of the loss of light entailed by fogs has been estimated, for expenditure on artificial light alone, at £7,000 per day. This item excludes the expense and loss occasioned by the disorganisation of traffic and the damage done to buildings, decorations, and all kinds of property. Looking at the matter as a whole, it is not oversteating the case to estimate the annual cost of fogs in London at from three to five million pounds. It might be imagined that these figures would bring home to the mind of the citizen, who is ever tender of his pocket, that something was radically wrong, more especially when it is recollected that there is an enormous increase in the death rate after a period of fog, and that Continental cities are practically

immune from the species of black fog from which so many English cities suffer. The influence of domestic heating arrangements on the atmosphere of a city is strikingly shown by comparing New York and London. The population of the former is within a million of the latter, and their situation may be roughly regarded as similar. Yet in one case the atmosphere is clear, in the other it is habitually murky. The essential difference lies in the fact that bituminous coal is consumed in London, whilst anthracite is used in New York. The methods of combating the evil are difficult to define and still more difficult to introduce. To prevent the use of a certain class of coal by legislation would be looked upon as an undue interference with the rights of the individual, who, however, as Mr. Austin rightly asserts, is content to look on at other restrictions without comment. Gas companies have, under penalty, to supply an illuminant at or above a certain minimum candle power. The cost of electric light and power is seriously enhanced by insistence on an elaborate system of safeguards. Our industries are handicapped by the necessity of keeping within provisions for protecting the lives and the health of our workers, which are unknown to foreign competitors. Yet such would be startled into active resistance if a law were promulgated to prevent the pollution of the air of our large manufacturing and business centres. The effect that such a law would have is evinced in the case of Pittsburgh where, a quarter of a century ago the furnaces and domestic stoves consumed bituminous coal, with a result that it was universally known as "The Smoky City." During the early eighties the natural gas, which was tapped in the oil fields of Western Pennsylvania, took the place of coal with an immediate and marked reduction in the characteristic from which the city derived its sobriquet. On this Mr. Martin bases a method of diminishing and gradually eliminating the smoke evil. In a carefully worked out scheme, with figures and constants sufficient to satisfy the most ardent statistician, he proposes to substitute gas for coal for the purposes of heating and power production. Not by the present system under which coal gas is manufactured and supplied by various companies in the cities, the cost of which would be prohibitive for use on a large scale, owing chiefly to the railway charges on the freight of coal to the retorts, but by a scheme of gas manufacture at the coal fields, to be transmitted under pressure by mains to the necessary centres. He considers, and his figures go to prove, that the economies thereby effected would more than meet the heavy capital outlay on the mains, and enable gas to beat coal out of the field on the question of price alone. To us in Ireland the matter is one rather of academic interest, although the idea of being connected directly by means of an undersea main with a gigantic gas producing plant in the English coalfields has its fascinations and its possibilities. At the same time, although in a far less acute form, the question of smoke abatement is one that has to be taken into account by the public health authorities, and the paper which we have briefly commented on, both by its facts and figures, is one which deserves far more than a cursory examination.

### "THE FIRE ON THE HEARTH."

This is the registered name of a new grate, probably known by reputation to our readers, but possibly not yet in anything like general use amongst them, as it deserves indeed to be. The ordinary grate of commerce, even the more modern up-to-date patterns, can hardly be described as ideal. "The Fire on the Hearth" has, on the contrary, much to commend it to general notice. Before describing its construction we may mention the chief advantages claimed for it, namely, that it is easy to fix, has neither raised fire, sunk hearth, nor parts to get out of order. The whole of the grate, being constructed above the floor line, is not likely to set flooring or other timbers on fire. The fire burns on a fire-brick body, with a metal front, and is surrounded by a full radiating lean-over fire back, while the draught can be regulated by the ash pan. "The Fire on the Hearth" pattern has of late become very popular, which is not to be wondered at, considering its excellent and scientific form, and the artistic character of the designs. The prices, too, are exceptionally moderate in price, ranging from £2 2s. upwards. This grate seems to us peculiarly well adapted to burning turf, a feature that it is well to bear in mind when specifying or ordering grates for use in the turf burning districts of Ireland most of the ordinary patterns of grates being quite unsuitable for that purpose, and much annoyance is often caused when this is found out only after the grates have been set in their places. "The Fire on the Hearth" is made by Messrs. Robbins and Co., Ltd., Fountain Works, Dudley, whose London Show Rooms are at 292 Regent-street, but the grate is also on sale by Messrs. Maguire and Gatchell, of Dawson-street, Dublin, who usually stock some of them.



## ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

### Irish Building Stones.

Professor Cole's lecture was of very great interest, and it was good to see such a respectable number of members present. The latter end of any session generally has shown signs of "dry-rot" in the way of attendances; let us hope that this session is going to prove an exception. Talking of Irish building stones, however, after the admirable and learned address of Professor Cole we should undoubtedly feel that Ireland can produce plenty of material fit for the mason's tool.

### Money.

It is a pity that the necessity should arise of having to pay for anything, especially with such an institution as ours. It does happen, however, that we have to pay rent, gas, coal, printing, and other charges. It would, therefore, be very desirable that the two-thirds of our members who have not yet paid this year's subscriptions should send in their cheques to the hon. treasurer as soon as possible. In his last whip round the treasurer gently hinted that donations to the funds would be acceptable. I understand that he has received no less than HALF-A-GUINEA in response!

### The R.I.B.A. Drawings.

One of our annual treats is the exhibition of a selection of the prize drawings in the English Institute competitions, and the exhibition just closed—and unfortunately open for a regrettably short period—falls in no way short of those of previous years. It is a matter for considerable satisfaction that our members should be afforded such excellent facilities for studying the work of our fellow-students on "the other side." It must also emphasise our regret that we in Ireland have not the same inducement to study and try as have those who are hoping to gain admission to the ranks of the R.I.B.A.

It is hardly necessary to comment upon the undoubted excellence of the work exhibited; such excellence must be induced when healthy competition for a tangible prize occurs. Who would not put forth a great effort when a prize of £100 and a medal is offered? And yet even in poor old Dublin (where a nian, or boy, has only to show that he has received some years of nominal training as an artied pupil to be admitted to the ranks of the R.I.A.I.), equal work has been produced, and no doubt will be produced in the forthcoming prize competitions of our own association. We do not aspire to such subjects as Neroian open-air baths, or John Thorpian Baconesque mansions, and unfortunately we have not such facilities for measuring and sketching as our English confrères enjoy, but our little exhibitions are still worthy of inspection.

Let us continue to live on in hopes of the time when it will be absolutely necessary for us to study and do our level best if we wish to enter into the sacred portals of the Irish Institute. Meantime let us sharpen up our weapons and do what we can, even without that inducement, but in the spirit of pure rivalry.

In view of the present strong position of the A. A. I., the following account of the starting of the old Architectural Association, taken from our issue of May 15th, 1872, is worth reprinting, and will be read with interest by the present members. Most of those whose names are recorded have, alas! joined the great majority, James Owen, John L. Robinson, J. J. O'Callaghan, D. J. Freeman, and Walter G. Doolin, having one by one passed away:—

A meeting of the above Association was held at the rooms of the Royal Institute of Architects of Ireland, 212 Great Brunswick street, on Thursday evening, the 9th inst., J. H. Owen, M.A., President of the Institute, in the chair. It was resolved as follows:—"That the junior members of the Architectural Profession, feeling that a

strong necessity exists that they should derive mutual benefit from meeting together and discussing points bearing on their profession; also by sketching classes, and paying visits both to ancient buildings and works in progress. Having called preliminary meetings, and finding that the idea is favourably entertained, they now beg to call together a general meeting, to take into consideration the formation of an Architectural Association of Ireland. Whilst they do not wish to be considered in any way antagonistic to the Royal Institute of the Architects of Ireland, they are desirous, as junior members of the profession, to be still under its guidance, yet acting as an independent body.

It was also resolved:—"That gentlemen be requested to send in their names as members of the Association; that as soon as a sufficient number be enrolled, further meetings take place."

The meeting then resolved itself into a general one. It was arranged that a provisional committee be appointed, consisting of the following:—Chairman:—J. H. Owen, M.A., President of the Royal Institute of the Architects of Ireland. Committee: Messrs. Thomas H. Longfield, John L. Robinson, J. J. O'Callaghan, D. J. Freeman, C. H. Brien, R. S. Swan, W. P. Ryan, and W. G. Doolin; and that they shall have power to receive names of proposed members; also to draw up a draft of rules to be submitted to the next general meeting for the carrying out of the objects of the Association.

## ARCHITECTURAL ASSOCIATION OF IRELAND.

There was a goodly gathering at the last ordinary general meeting, held on last Tuesday evening, under the chairmanship of the president, Mr. Harry Alberry. Amongst those present were:—Messrs. W. M. Mitchell (president R.I.A.I.), Beckett, Hayes, Millar, Bradbury, Hudman, Lusk, O'Callaghan, etc. Mr. James H. Webb, M.R.I.A.I. (past president), read his paper on "Shrewsbury," a most delightful description of that famous city, which was the venue of the last annual excursion of the members of the Association. The paper was illustrated by from 50 to 60 slides, most of which were from photos taken by members, and which proved of special interest to the members. Mr. G. F. Beckett proposed a vote of thanks to the lecturer, which was seconded by Mr. Edwin Bradbury, and supported by Mr. Hudman, and replied to by Mr. Webb.

## A SCIENTIFIC PATTERN OF STOVE.

Mr. W. J. Shaw, of 7 Donegall-square, W., Belfast, is agent for Messrs. George Jennings, Ltd., whose sanitary specialities are so well known to architects, builders, and engineers for their unvarying excellence. In addition to his better known sanitary appliances, Mr. Jennings is the manufacturer of the patent "Cambridge Warm Fresh Air Ventilating Stove," a very ingenious patent. The chief distinctive feature of this stove is that in any ordinary grate, after the fire is out, the flue continues to act as an extract shaft, withdrawing from the room the atmosphere which the fire has warmed, and which is replaced by cold air drawn into the room by the door and window crevices in the form of draught; with this grate, although the same extracting action takes place, so long as the flue is warm the air withdrawn is replaced by fresh air equally warmed by its passage through the ventilating body of the grate, which is far hotter than the flue, and remains warm for hours after the fire is out. The whole arrangement of this stove is clever, and peculiarly fits it for use in hospitals and other positions where efficient ventilation, without undue loss of heat, is of primary importance. It has for this reason been adopted throughout the new Cambridge Hospital, Aldershot. Practically the whole radiating surface is of fireclay—a very important point, as it is well known that highly-heated metallic surfaces vitiate the air, while parting readily with their heat. The air is first admitted from a pure external source, and then enters the lowest portion of the warming chamber; from this, flowing alternately through the openings, it is gradually and moderately warmed by prolonged contact with the fireclay back and flanges of the warm air chamber till it is finally discharged either at the top of the stove, or, if preferred, through a warm air shaft conducting to an outlet near the ceiling. The horizontal back ribs ensure close contact with the ascending atmospheric current, and consequently also that the fresh air shall be effectively and gradually warmed. The stove can be made either to stand in the middle of the room or to be fixed in the chimney-breast. Mr. Jennings also makes a grate of somewhat similar principle, but cheaper, and more adapted for ordinary domestic use. It is known as the "London" Warm Fresh Air Ventilating Grate. Sheets containing illustrated particulars and sections, with prices, may be had on application to Mr. Shaw, or direct to Messrs. George Jennings, Ltd., sanitary engineers, London, S.E.



### OUR SOUTHERN LETTER. (FROM OUR OWN CORRESPONDENT.)

#### Railways.

In connection with the Cork City Railways and Works Bill at present in Parliament the Examiner of Private Bill found that the Standing Orders had not been complied with, as the consent of the Cork County Council, the Cork Corporation and the several railways interested had not been proved. This matter being brought before the Standing Orders Committee, the non-compliance in these technical matters was dispensed with, and the Bill now stands for second reading. In Parliament a question has been asked in reference to some alleged correspondence between Mr. Walter Long, the Treasury, and Lord Barrymore during the session of 1905 in connection with a Treasury grant in aid of the proposals in the Cork Junctions Railways Bill, which was then the only Bill in connection with the Cork railways before the house. The original grant promised by the Treasury was on the condition that the Cork and Fermoy Railway was constructed.

The only Bill which attempts any substitute for this is the Cork and Waterford Railways Bill, and the promoters of this scheme propose to make a junction between Youghal and Cappagh.

#### Waterworks, Etc.

The Kinsale Rural District Council have under consideration a scheme for constructing a water supply for Crosshaven, and the two military forts at Camden and Templebreedy. Mr. R. Evans, C.E., has prepared the suggested scheme, and estimates the total cost at about £15,000, and considers Crosshaven alone could be supplied for about £8,000. The military authorities offer £300 a year for ten years, and £250 a year for the next twenty years after, and after that an agreed water rate; the Maunsell Eyre Estate, through which the supply runs, offer £50 a year, and the Cork, Blackrock, and Passage Railway Company offer also £50 a year until the water rental is increased by those sums.

The Council considered that the military authorities have not made an offer sufficiently liberal to justify them in carrying out the extra expenditure of £7,000, and unless the offer is increased they recommend that the smaller scheme be carried out. They also expressed a hope that the offer would be increased to a sum of £8,000, to be paid on the completion of the work. This could be arranged as a Military Works Loan, and would give the War Office more control over the scheme and the management of the supply, as they then would be joint owners.

The Cork Waterworks Committee have decided to expend the sum of £400 in carrying out the extension to the filtering tunnel at the waterworks.

The Local Government Board have sanctioned the loan of £1,520 for the completion of the Tibbstown Waterworks, applied for by the Queenstown Urban District Council, but refused a sum of £480 applied for, which was to be used for the extension of the mains of the town, as in their opinion this work should be paid for out of revenue.

The Bandon Rural District are applying for tenders for the laying of additional water mains in the town, and have borrowed the sum of £1,000 for the purpose of carrying out these and other improvements.

The Mitchelstown Rural District Council have applied for a loan of £1,250 for the purpose of improving the sewerage of Mitchelstown, in accordance with plans and specification prepared by Messrs. Kaye-Parry and Ross.

The Cork City Engineer now reports that the new Town Hall is approaching completion, and that he is now preparing the details of the stage, platform, and the seating, which will be extra on the contract. He considers the time has arrived to settle the question of lighting, and it was decided that the Council should invite proposals from the Cork Gas Company and from the Cork Electric Light Company.

### THE RHODES PATENT SASH HANGING COMPANY. FAIRHOLT WORKS, STOKE NEWINGTON, LONDON, N. A New System of Sash Hanging.

These pulleys, known as Rhodes' Patent Teeth Pulleys and Steel Chains, are designed for the hanging of sliding sashes, doors, shutters, lifts, shop fronts, blackboards, etc. They are stocked in all sizes, and are, we understand, made with the best British materials and workmanship. The chains are exceptionally strong, having a breaking strain of 1,200 lbs. and upwards; they can readily be applied to every class of old or new buildings, and no alteration is needed in the sash, frame, or weight.

These pulleys and chains have many advantages, notably the economy effected by the non-renewal of cords, wire, etc., the prevention of accidents, and breaking of glass. Moreover, sashes hung on this principle are more easily moved up or down. They have been used in a large number of Government offices, hospitals, insurance offices, banks, and other public buildings. Architects, builders, and others, can obtain all particulars on application to the makers.

### CORRESPONDENCE.

#### THE NEW CONDITIONS OF CONTRACT.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—Referring to the recent correspondence which has appeared in your columns on the subject of the new conditions of contract, does it not seem a little premature to discuss or condemn the new conditions until they have been formally put forward by the architects—that is, unless there be indications of an intention on the part of the architects to "rush" these conditions on the builders, of which I see no present signs? Might I suggest that a joint meeting of the Institute of Architects and of the Master Builders' Association should be held, and be open to all members of both societies? The matter could then be fully thrashed out, and the members given an opportunity of hearing the other side of the case. Moreover, many humbler individuals—architects and builders—would have an opportunity of expressing their views, which would not be the case if the matter were committed to delegates or sub-committees. Of course, it would be hopeless for such a general meeting to settle matters of detail: that should be referred to a committee for consideration and report.

Possibly, if the Institute of Architects does not take the initiative, the Builders' Association might approach them. I throw out the suggestion for what it is worth.

It may be of interest to your readers to know that a dispute on the subject of "conditions" exists between the master builders and architects of Inverness, and the matter is fully reported in the current issue of the Master Builders' Association Journal. It seems that during 1903 and the early part of 1904 representatives of the Inverness architects and the Inverness contractors, who had been specially nominated for the purpose, framed a set of general conditions to apply to all contracts undertaken in Inverness and district. These conditions, after being adjusted, were submitted to a general meeting of architects and contractors, and were adopted. They were signed on behalf of the contractors by two representatives of each trade, and they were subsequently signed by all the architects in Inverness except two, who have declined to do so—one on the ground that the new conditions were prejudicial to the clients' interests and the architects' control, the other on the ground that he had not had time to go into the matter fully. The contractors recently met together, drafted a resolution binding the builders not to tender for any works of these two architects. This pledge was in course signed by nearly all the Inverness contractors, with a few exceptions. Subsequently it was decided to approach quarry owners, timber merchants, &c., with a view to arranging a boycott of the refractory builders who had not signed the pledge. What the ultimate result of this internecine strife may be I cannot venture to say, but any of your readers sufficiently interested may find all the details, together with some lengthy letters from the rebellious architects and from the Builders' Association, in the journal I mention.—Yours, &c.,  
SIMPLEX.

### BUTTRESSED MASONRY DAMS.

BY MR. M. T. ORMSBY M. INST. C.E.I.

With solid masonry dams less than about forty feet high the pressure set up is much less than either the masonry or a rock foundation could be relied upon to bear with safety. By building dams of that height or less much thinner, and building buttresses to guard against overturning, a considerable saving in masonry results. But in this case economy, as well as stability, requires that a batter should be given to the inner, or water, face of the dam. In the paper arbitrary laws have been assumed for the thickness of continuous wall and for the ratio of space between buttresses to thickness of buttress. The remaining dimensions are then calculated to fulfil certain conditions, one being that there shall be no tension at the heel of the dam. Two other conditions are dealt with, namely:—

1. That the size of buttress shall be a minimum.
2. That the angle between the vertical and the resultant force on the base shall not exceed the limiting angle of friction for the materials.

Full tables of dimensions are worked out to satisfy these conditions, and are shown graphically in curves.

The saving in masonry, as compared with solid trapezoidal dams of the same height, is shown to be from 40 to 28 per cent.

The maximum vertical pressure on the base is shown not to exceed about 5 tons per square foot, with heights up to 40 feet.

The Paper will conclude with a short account of a few examples of buttressed dams and of some experiments illustrating the subjects dealt with in the Paper.

Abstract of Paper read on April 4, 1906, before the Institution of Civil Engineers, Ireland.

## LAW.

## Action Against Dublin Architects.

In the King's Bench Division (Civil Side) last week, before Mr. Justice Boyd, in the case of Hartan v. Macnamara, Mr. Dickie (instructed by Mr. Robert Dickie, solicitor), applied on behalf of the plaintiff, for an order for discovery of documents. The action was brought by Mr. Edward Hartan, a merchant in Kingstown, against the Messrs. Macnamara, architects, carrying on business in Dublin, for alleged negligence in preparing plans and carrying out the erection of buildings in Kingstown for the plaintiff. There were necessary letters and documents in defendants' possession which the plaintiff required before statement of claim.

His Lordship adjourned the application till next sittings.

## West-end Ancient Light Case.

In the English Chancery Division on 26th inst, Mr. Justice Joyce delivered judgment in the case of Fryer v. Windus and others.

In this case the plaintiff, Mr. Alfred Fryer, the sub-lessee of a building called Cavendish Chambers, Hallam-street, W., sued the defendants, Mr. James Windus, Mr. W. S. Hoare, and Messrs. E. Lawrence and Sons, builders, to restrain them from continuing the erection of new buildings in Great Portland-street, being at the back of the plaintiff's premises, so as to cause a nuisance to the plaintiff or his premises, and from injuring, darkening, or obstructing the access of light through a skylight, and certain windows in the plaintiff's premises, as the same were formerly enjoyed, and an order to pull down so much of the buildings as were higher than the old buildings which formerly stood on the site. There was also a claim for damages. The statement of claim alleged that the height of the defendants' old buildings was 48 ft. from the ground level, and 20 feet from the party-wall, and that defendants had erected on the site a new building consisting of shops, warehouses, and tenements, the rear walls of which were about 60 feet in height and only about 10 feet from the party-wall. Plaintiff alleged that the effect of this was to cause a substantial decrease of light coming to the lights and windows in question, and was such as to render his house uncomfortable according to the ordinary notions of mankind. There was also a claim for trespass in connection with the party wall.

By their defence the defendants denied that their new buildings had, or would, cause any nuisance to the plaintiff as alleged, and that they would to any appreciable extent affect the plaintiff's light, or interfere with the comfortable enjoyment by the plaintiff or his tenants of the premises. (The case was reported in the *Builder* of March 3rd last.)

Mr. Hughes, K.C., and Mr. Crossfield appeared for the plaintiff, and Mr. Younger, K.C., and Mr. Edward Ford for the defendants.

In giving judgment his lordship said that by the action the complaint was of a two-fold nature. The first was as to the erection by the defendants of the party-wall above the height which the plaintiff authorised them to raise it, and which it was alleged on behalf of the defendants was done in error. However that might be, it was clearly unwarrantable, but as during the trial the defendants had offered to take it down, it was not material for him (his lordship) to say anything more about it except perhaps on the question of costs. The other complaint was as to the construction of light to certain windows in the plaintiff's building. On the hearing of the motion for an interlocutory injunction it was agreed as regarded the plaintiff's claim for a mandatory injunction the rights of the parties were to be the same as if the trial had taken place at the date of the motion, and that his lordship should assume that the defendants' new buildings were then in the condition shown on the ground plans and elevation. The plaintiff was an under-lessee for the residue of a not long term of years—seven years from December, 1904. His immediate reversioner was not a party to the action, and the ultimate reversioner was the ground landlord of the defendants as well as of the plaintiff. That gentleman did not desire to have any part of the defendants' building removed, and his lordship thought that under the circumstances the plaintiff could be properly compensated by damages being awarded to him if he was entitled to any relief. His lordship having specifically described the windows in the plaintiff's building alleged to have been affected by the defendants' buildings, said he came to the conclusion that none of the plaintiff's windows, or the rooms lighted by them on the ground and first floors, were ever specially well lighted in any sense, or more than sufficiently lighted for the ordinary use and occupation of rooms in a dwelling-house or flats. He thought that really the light was deficient accord-

ing to the notions of ordinary people. He was of opinion that the light to the studio through its only light—the skylight—had been greatly diminished by the defendants' new buildings. The defendants by their new buildings had not only obstructed a considerable amount of light coming to the room, but they had rendered it less comfortable, and had made it unfit for the immediate purposes for which it was formerly used. With regard to the window "K," that was the only window lighting a bedroom on the ground floor in the plaintiff's building, it would be idle to say that that room had ever been well or sufficiently lighted. The light to it had always been obstructed. Some of the witnesses alleged that the room, although badly lighted, was sufficiently lighted for a bedroom. His lordship said that the room had always been a dark room, and by reason of the defendants' buildings the light coming to the upper portion of the window had been further diminished, and actual damage thus occasioned to the plaintiff. The window "C" on the first floor lighted the staircase, and "D" was a window lighting a water-closet and bath-room. These windows had been rendered darker by reason of the defendants' new building. The rear room on the first floor was lighted by the windows "A" and "B," the room being at present unoccupied. He found that this room was never well lighted. It was dark before and uncomfortably dark now by reason of the defendants' buildings, and the room thus rendered less comfortable. His lordship, having referred to the other windows in the plaintiff's building said to have been affected by the defendants' new buildings, said he was of opinion that what the defendants had done could fairly be held to be a nuisance, and he so decided. He must award the plaintiff some damage, and he fixed the amount at £120, and the defendants must pay the costs of the action.

Mr. Younger, on behalf of the defendants, agreed to pull down the portion of the party-wall which was too high within three weeks.—*The Builder*.

## REVIEWS.

## The Ventilation, Heating and Lighting of Buildings.

By J. W. THOMAS, F.I.C., F.C.S. London: Longmans, Green and Co., 39 Paternoster Row, 1906.

This general and comprehensive volume will be found useful by those engaged in connection with either the heating, ventilation, or ventilation of buildings. The present work is by the same author as the excellent little volume on the "Ventilation, and Heating of Churches and Public Buildings," reviewed by us some time since. Although the present work is not a very large one in bulk, still it covers a pretty wide range of ground, and is quite up to date. The subjects referred to are dealt with, not alone in theory, but with a good deal of practical detail, many appliances and patents being described and illustrated.

An interesting chapter is devoted to "smoky chimneys," which, the author truly observes, are amongst the greatest troubles a householder has to face; and he points out that their cure is generally undertaken in the most "rule o' thumb" and unscientific fashion, and declares that in the majority of cases where gigantic tall boys are fixed, that what is really needed is not so much a lengthening of the flues as the selection of a suitable grate, and a good terra-cotta pot are more effective than a very high "tall boy." And many useful hints as to the cure of smoky chimneys are given. The author points out that very often no cowl that ever was devised will cure a chimney, because the fault is due to the flue being cold, too small, obstructed, or insufficiently supplied with fresh air.

In the subsequent chapters, heating and lighting by means of electricity, coal gas, acetylene, &c., are dealt with, also the various systems of hot-water and steam-heating, both by pipes and radiators. Altogether, the work is a useful one and to be commended to all interested in the subject.

## BOOKS RECEIVED.

**The Local Government Annual and Official Directory, 1906.** Officially corrected. Edited by S. Edgecumbe Rogers. Fifteenth year of publication. Price 1s. 6d. "The Local Government Journal," Ltd., 27A Farringdon street, London, E.C.

**Departmental Decisions** by the Local Government Board, Board of Education, Home Office, Treasury. Quarterly Issue No. 1. Michaelmas-Christmas, 1905. Price 2s. S. Edgecumbe Rogers, 27A Farringdon-street, E.C.

**The Water Supply of Villages and Small Towns.** Practical notes in a handy and portable form. By H. C. H. Shenton, M.S.E., Gold Medalist, Society of Engineers. Price 6d. S. Edgecumbe Rogers, "The Local Government Journal" Office, 27A Farringdon-street, London, E.C.



## IMPORTS.

## PORT OF DUBLIN.

March 21, per City of Oporto, from Antwerp, 150 cases window glass, T. Dockrell, Sons, and Co., Ltd.; 50 do., do., A. H. Meyer, Ross, and Co.; 6 do., do., P. R. Goodbody; 16 do., do., J. Hall; 80 do., do., T. and C. Martin, Ltd.; 60 do., do., Hoyte and Son; 36 do., do., to order; 1,205 steel joists, to order; 3 cases limestone, to order.

March 22, per City of Dortmund, from Antwerp, 39 joists, to order.

March 23, per Winga, from Goteborg, 47 cases glass, 6 bags turned wood, 220 bundles mouldings, 2,200 bundles laths, 4,670 pieces planed boards, to order: per Bangor, from London, 340 tons cement, T. and C. Martin, Ltd.; per Island Maid, from Glasgow, 180 tons bricks, E. and J. Burke; 40 tons bricks, Ringsend Bottle Co.

March 24, per Aranci, from Chester, 140 tons bricks, J. M'Ferran and Co.; per Problem, from Chester, 105 do., do., J. M'Ferran and Co.

March 26, per City of Cologne, from Hamburg, 7 crates glass, to order; per Lady Hudson-Kinahan, from London, 440 sacks cement, J. M'Ferran and Co.

March 27, per Result, from Chester, 130 tons bricks, T. and C. Martin, Ltd.

March 28, per Harkaway, from Belfast, 150 tons bricks, S. H. Gilford.

April 2, per Ville d'Eu, from Treport, 300 bags plaster; per Abingdon, from Middlesboro', 510 tons cement, S. Grimason; per Tennant, from London, 300 tons cement, J. and G. Crowe; per Faith, from Cowes, 120 tons cement, G. Chadwick; per Marian, from Bridgewater, 1½ tons pipes, etc., Monsell, Mitchell, and Co., Lt.; 93½ do. Jo., J. Kelly and Son; per William Keith, from Bridgewater, 160 tons bricks, goods, T. and C. Martin, Ltd.

The Glasgow Corporation have given the further contracts to Messrs. Helliwell and Co., Limited, for the glazing on their patent "Perfection" system, to the roofs for the new Car Sheds at Pollokshaw road and Albert road, for the Coplawhill Extensions.

## ENGINEERING NEWS.

**Bandon.**—BANDON RURAL DISTRICT.—The Council of the above district will to-day, the 7th April, consider tenders for the laying of additional water mains in the town of Bandon.

**Ennistymon.**—The Ennistymon Rural District Council, at their meeting on Tuesday, March 27, received tenders for a combined scheme of water supply for the towns of Ennistymon and Lahinch, but as all of the tenders submitted exceeded the amount which the Council stated (in the advertisement calling for tenders) should not be exceeded, viz., £5,000, none were considered, the Clerk being instructed to re-advertise.

The action of the Rural District Council is characteristic of the manner in which many of these bodies conduct their business. The estimate of the engineer, Mr. B. Sheedy, of Lime- rick, was £6,500, but in face of this figure, which the Council had before them, the Council decided, after the first advertisement was issued, to restrict the price to £5,000. It may be noted that nineteen contractors applied for bills of quantities on the appearance of the first advertisement, but most of them returned them on seeing the second advertisement, and only seven tenders were received. The Council is merely wasting the ratepayers' money in advertising further.

## TENDERS.

**Belfast.**—For erecting four one-storeyed pavilions, laying water mains, constructing drains, walks, tanks, etc.; erecting a two-storeyed hospital, a mortuary, and additions and alterations to administrative buildings, at Abbey Sanatorium, Belfast:—

	Pavilions, etc.	Hospital, etc.
Colwell ... ..	£11,300 0 0	£13,756 0 0
Geddis ... ..	10,696 0 0	
Lees ... ..	10,450 0 0	12,850 0 0
Courtney and Co. ...	10,377 0 0	12,348 0 0
M'Roberts and Armstrong	10,350 0 0	12,000 0 0
Laverty and Sons ...	10,342 0 0	12,584 0 0
Campbell and Son ...	10,290 0 0	12,640 0 0
Henry and Son ...	10,100 0 0	11,900 0 0
M'Laughlin and Harvey	9,890 0 0	11,450 0 0
Kidd ... ..	9,868 0 0	13,350 0 0
Keith ... ..	9,844 0 0	11,800 0 0
Corry and Co. ... ..	9,600 0 0	11,250 0 0
J. and R. Thompson ...	9,598 0 0	11,697 0 0
H. and J. Martin ...	9,593 0 0	11,472 0 0
J. and W. Stewart ...	9,475 0 0	11,245 0 0
Dowling, Belfast (accepted)	9,432 0 0	10,928 0 0

## COMPETITION.

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APRIL 21, 1906.

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## TOPICAL TOUCHES.

In this issue we publish the admirable paper on Producer Gas Plants, read before the Engineering and Scientific Association of Ireland at a recent meeting.

The Royal Institute of Public Health will meet this year in Cork. The Congress will take place at the end of June, and last a week. An influential and representative reception committee has been formed.

We are glad to learn that the architect of the new College of Science, Dublin, Sir Aston Webb, has recently been considering the suitability of Irish building materials, and that if the prices be satisfactory, it is probable they will be largely used in the new structure.

It has been decided that a visit should be paid by a number of members of the Institute of British Clay-workers this year during the Whitsuntide holidays to Ireland, and the hon. sec. has been instructed to draw up a programme to this end.

"Trade follows the flag," they say! The first fruits to trade of the Russo-Japanese war have been gathered by the Steel Corporation of New York in the shape of a Japanese order for 50,000 tons of steel for use in the 200 bridges it is intended to build on the Seoul-Wiju Railway in Corea.

At the last meeting of the Executive Committee of the Dublin International Committee the special requirements to be provided for in plans for the fine art building, dining rooms, kitchens, etc., were discussed with the Consulting Architect, Mr. Kaye-Parry, and plans for the agricultural pavilion and several other buildings were recommended for adoption.

At the same meeting reports from the Works, Lighting, and Machinery Committee relative to plans for the power house, machinery pavilions, gas pavilion, and electrical pavilion were received and adopted.

The Executive Committee have given grave offence to the Dublin Master Electrical Contractors by giving away to a Belfast firm and without competition the contract for the entire electric lighting of the exhibition. This matter is on a par with the committee's action towards the Dublin Master Builders.

To say the least, this action is hardly calculated to engender enthusiasm for the welfare of the Exhibition on the part of Dublin contractors; the joint architects and engineers, Messrs. Ashlin and Ryan, two of the most distinguished men in their profession, whose names and professional attainments were utilised for all they were worth, and their "brains sucked," were shamefully treated, then the Master Builders of Dublin boycotted, their protest flouted, and their spokesmen insulted. Now we find the master electrical contractors come in for like treatment. Presumably similar treatment will be meted out to others!

The members of the National Federation of Building Trade Employers of Great Britain and Ireland will visit Dublin on 31st July next. We hope later to publish details of the arrangements.

In this issue we describe a very interesting sewage purification works at Maesteg, South Wales, recently completed. The Septic Tank\* Company's system of purification has been adopted and used with great success.

The annual dinner of the Institution of Civil Engineers of Ireland will be held at the rooms of the Institution on 3rd May. His Excellency the Lord Lieutenant will honour the members by being present on the occasion.

The tender of Mr. Andrew Cullen, of New Ross, has been accepted for the new parochial house in that town. The contract amounts to about £3,000, and the work has begun. The architects are Messrs. Doolin, Butler, and Donnelly, of Dublin.

Building contractors in Ireland who had been looking forward to the advent of the present spring for some improvement in the terribly depressed state of the building trade, have been grievously disappointed. On every hand and in every quarter of the country the same tale of slackness of business, and even total absence of business, prevails. What is worse is, that there are no signs of improvement, and everything points to an exceedingly black year.

As a natural consequence there is great dearth of employment amongst the artisans and labouring classes, while architects are largely amongst the ranks of the unemployed. In England things are bad, too. It gives some idea of slackness on the other side when we mention that in the recent competition for a Carnegie Library for Bangor over 100 designs were received for this not very large work.

The "Irish Times" tells us that a very fine church, erected in memory of Cardinal Newman, has been built at Edgbaston, and is to be opened in July. At present the structure is probably unique, for it contains intact the smaller church it is to supersede. The new building—the Church of the Immaculate Conception—will undoubtedly take a high position in the Midlands as a good example of Italian architecture. The interior is practically a copy of a Roman Basilica. One of the chief features is a series of six noble marble columns which support the roof on each side of the nave. These monoliths have been brought from the Carrara quarries in Northern Italy, and are said to be the largest in England. They are nearly 18 feet high, and have a diameter at the base of rather more than two feet. Each is crowned by a beautifully carved Corinthian capital. In this connection it is interesting to recall the fact that London has a statue in marble of the Cardinal outside Brompton Oratory. Though a fine piece of work and a dignified memorial, it is deplorably dirty. As usual in the daily Press, the very name of the architect is not even referred to.



## POWER GAS PLANTS: THEIR PRESENT APPLICATIONS AND FUTURE POSSIBILITIES, WITH SPECIAL REFERENCE TO IRELAND.\*

By THOMAS RIGBY, A.M.I.E.E., F.C.S.

### Gas Power in Ireland.

This paper is intended to show on what lines the use of gas power is likely to be employed in Ireland and the views of the author as to the future use of such power in this country. The question arises as to which kind of fuel should be used for the production of power, and this depends in great measure on the price at which fuel can be purchased. Unfortunately, the supply of fuel from the Irish coalfields is very limited; the greater bulk of the coal burnt in the country being imported. As a consequence, the price of most kinds of fuels obtainable is rather high as compared with that in use in Great Britain, and it might be advisable to say, in the first place, that all carbonaceous fuels can be used for the production of power gas, and the deciding factor as to the type of plant to be employed should be the price of the fuel in relation to its heat value. The freight on all kinds of fuel is very much the same at most of the ports in Ireland, and when freight and carriage form a great proportion of the cost it is better to use the fuel having the greatest heat value. Now, the difference in price between the two main fuels used in the country, namely, anthracite and Welsh or Scotch semi-bituminous fuel is very small, and for that reason under present conditions, in the great majority of cases, the best fuel to use is anthracite, not only because of its greater heat value but also because the plant required for converting it into gas is very simple.

### Pioneer of Gas Producer Plants.

The pioneer of gas producer work for power gas purposes is Mr. J. Emerson Dowson, who patented, in 1878, a plant in which air and steam in a superheated condition were passed through a bed of incandescent fuel whereby a richer gas was obtained than had hitherto been the rule. Many years previous to this date gas producers had been introduced on a practical scale by the late Sir William Siemens in connection with his steel furnaces and other industrial applications of gas firing. Previous to 1878 Sir William Siemens had tried to adapt his producer gas to work with the gas engine, but from a combination of circumstances which were not understood, his efforts were never successful. Probably the main reason for this was, that the gas engine in those days was a mere toy compared with what it is now, and his gas was not of very good quality. In consequence great difficulty was experienced in obtaining ignition in the cylinder of the gas engine he employed. When Mr. Dowson brought out his producer plant the quality of the gas he obtained was sufficiently rich to ensure its successful use in gas engines, and my firm at that time put at his disposal several engines specially designed to use his gas, with successful results. For a number of years no serious competitor entered the field against Mr. Dowson, and a great many of his plants are working in various parts of the world. The great drawback to them, however, was, that a separate steam boiler and gas holder were necessary; also the fuels he could use were confined to anthracite or the best coke, free from tar, and this limited the field for them to small powers, except in districts where coal was expensive and distant from the coal mines. It is for this reason that most of these types of plants are found in the South of England.

About ten years ago Benier, a French inventor, conceived the idea of making the piston of the gas engine aspirate the gas from the producer direct without any intermediate storage or gasholder. He also conceived the idea of obtaining the necessary steam for the production of a high quality gas, from the heat of the gases leaving the gas producer. Now, the temperature of the gases leaving an anthracite gas producer are approximately 600 degrees Centigrade, and to enable this gas to be successfully used in a gas engine it is necessary to cool it to atmospheric temperature, at the same time freeing it from impurities. The quantity of heat contained in the gases leaving the gas producer at such a temperature is sufficient, if properly recovered, to generate all the steam necessary for the efficient gasification of the fuel, and this Benier obtained by means of what is known as the vaporiser, or saturator. Unfortunately his efforts did not meet with the success they deserved, and there is no doubt, that if the gas engine had been in as forward a state as it is at the present day he would have been successful, after a little experience, in the design of a gas producer, and he would have been the possessor of a very valuable patent indeed, as later events prove.

About the year 1901 simultaneously several firms on the Continent, such as Julius Pintsch and the Deutz Gas Engine Co., together with my own firm in England, were experimenting with the suction plant as was originally evolved by Benier, and at the Royal Agricultural Society's Show at Cardiff, in 1901, my firm showed and worked a gas producer which dispensed with the use of a steam boiler and gasholder. Rapid strides have been made since that date, and in 1902 the Dynamic Gas Co. entered the field in a similar line. At the Royal Agricultural Show at Park Royal, in 1903, Mr. Dowson showed his first suction plant, and since that date numerous other firms have

entered the field with various types of suction gas plant using anthracite fuel, but all of them possess the main principle as originated by Benier, whereby the gas was drawn into the cylinder during the suction stroke of a gas engine.

Since the Cardiff Show my firm have made something like 30,000 h.p. of these gas plants, working on the suction principle—probably as much as all the rest of the English firms added together—and at the rate which they have been constructed is increasing very rapidly; indeed, they have put down a special works for the purpose of building them.

Slide 1 shows an elevation of a typical suction gas plant as manufactured by my firm, and Slide 2 shows a section of such a gas plant, from which you will see that the fuel is contained in a cylindrical firebrick chamber. The vaporiser is shown in the upper portion of the producer, and is constructed entirely of welded steel plates, a special plant having been designed for making them. This I consider an improvement on the usual type of vaporiser employed either by English or Continental makers. A great many makers employ for this purpose a cast-iron boiler, but I have found from experience that if by any chance this boiler runs short of water (if constructed of cast-iron) it will crack. When it is made of welded steel as we make it the only damage that could happen to it is for it to be buckled. In the early days of steam boiler manufacture they were made of cast-iron, but at the present time no one would think of constructing a steam boiler on such lines, and it seems to me that the same principles apply to the steam vaporiser of a suction gas plant. In the centre of the boiler is arranged fuel storage capacity in such a manner that the fuel in the producer is kept at a constant working depth. The lower portion of the boiler defines the working fuel depth. An air-locking device is arranged in the upper portion so that fuel can be charged whilst the plant is at work without any risk of drawing in air from the atmosphere. A storage capacity of four hours' supply at full load is provided.

At the lower portion of the producer it will be seen that the firebrick lining is kept a few inches from the firegrate. This is done for a purpose. All the air and steam entering the producer are arranged to enter through the firegrate proper. The consequence is that the highest temperature being found at the grate level any clinker formed in the producer is formed on the firegrate from whence it can easily be detached in a flat cake without interfering with good working. It is necessary for efficient gas production that a solid depth of fire is maintained constantly. Clinker when formed has a peculiar affinity for brickwork, combining with the silica, and the combination with the silica in the firebrick promotes irregularities of working owing to the fact that this clinker holds up the fuel bed and so produces holes and cavities therein. A great difficulty with clinker on brickwork is that when the clinker is detached, as it must be for efficient work, every such removal also removes a little of the brickwork lining of the producer, with the consequence that frequent renewals of this brickwork are necessary in most suction gas plants. With the device I have mentioned there is no clinker formed on the brickwork, and as a rule no brickwork is detached in removing the clinker, and a long life of the brickwork is ensured, with the additional advantage that regularity of the quality of gas produced is brought about. To leave such a space at the level of the firegrate without any other provision would ensure great radiation of heat, with the consequence that an appreciable heat loss would be experienced. To obviate this, you will see from the section that superheaters are arranged at this level, and surrounding the region of intense combustion, and the heat, which would otherwise be wasted, is carried back in regenerative fashion by the air and steam passing on their way through these super heaters to the underside of the firegrate.

### Difficulties of Manufacturers.

One of the difficulties which has been experienced by suction gas plant manufacturers has been the regulation of the steam produced so as to keep something like a proportionate quantity of air to steam passing through the fire constantly. It will be understood by you that if an engine working at full load is making the requisite quantity of steam to give satisfactory gas at that load, that if this load on the engine is considerably reduced suddenly, it is not easy to also adjust the rate of steam production instantly to conform with it, as there is a certain inertia of steam raising which cannot be overcome. The way this difficulty has been got over on the suction plant constructed by my firm is to arrange two separate air inlets, one known as the primary air supply leading direct to the underside of the firegrate, and the second, known as the secondary air supply, being arranged above the steam boiler or vaporiser. It will be readily understood that the path of least resistance for the air entering the fire will be by the way of the primary inlet, and if the area of the orifice of both the primary and secondary inlets are adjusted, it is so possible to ensure that the quantity of air entering the primary inlet is nearly constant by constricting it somewhat. If then the quantity of air that can pass through such a constricted orifice is so limited that it is not sufficient to produce gas enough to drive the engine on a light load, it is evident that when any working load is on the engine at all that the

\* A paper read before the Engineering and Scientific Association of Ireland, March 26th, 1906.

remainder of the air must necessarily pass through the secondary cock above the vapouriser. This is so arranged that any air entering must pass over the surface of the hot water in the vapouriser, with the consequence that this air is saturated with water vapour, and by this means the quantity of steam admitted to the fire is limited to exactly what is required. I have found out in practice that it is not only necessary to regulate the steam in direct proportion to the air passing through the producer, but that when working at light loads less steam in proportion to the air is required than when working at the full load, and this I think will be clearly understood by you when you take into consideration that the temperature of the fire at a light rate of combustion is not nearly so intense as when it is working at the fullest rate at full load. As the heat of the fire has to be utilised to decompose such steam it is evident that the most steam will be decomposed when the producer is working at full load, and by this device constant temperature is obtained, the quantity of steam passing through the producer at light load being in a lesser proportion to air than when working at the full load.

At the same time, any sudden variations in load on the producer do not seriously prejudice regulation of any excess steam, as at such times this excess steam can escape through the secondary air-cock or cocks on the top of the generator. A fairly uniform temperature of fire and a fairly uniform quantity of gas is so obtained at all loads.

The author would like to point out that although all suction gas plants work on Benier's principle, yet it is with modifications of design such as those I have described that successful working is ensured, and all improvements with suction gas plants using anthracite fuel is now in such details of design.

#### What Can be Done.

There is no limit within reason to the number of engines which can be worked from a suction plant, and quite a number have been put to work, having several engines working from one suction gas plant. At the works of Messrs. G. and J. Weir, Engineers, of Glasgow, there is a plant of 200 b.h.p. capacity, which is supplying seven engines.

There is a great demand at the present time for such combinations for use for various electrical purposes. A great number of these are for private house lighting, others are for central electricity works, and my firm have fitted a large number of these during the last four years.

The first to be put to work for such a purpose in England was at Milford-on-Sea for my friend, Mr. Frank Christy, of Chelmsford. The result of the first year's working was that, although the plant only worked every second day and supplied current through accumulators, that the cost for fuel consumption averaged over the year and including all distribution and accumulator losses was something under 3 lbs. of coal per unit sold. This he considered extremely good, as I think you will agree it is, for such a small station. The size of the gas dynamo was only 20 kilowatt capacity, and at the time the results were taken the number of lamps that had been wired was something under one thousand of 16 candle-power each. Since that date I understand that the number has been doubled, and a second unit has been added to the station, and the coal costs now come out about 2 lbs. of coal per unit sold, the load factor, of course, being better.

#### Suitability to Small Works.

For small work, at any rate, I think there is no doubt that the suction plant and gas engine have come to stay, as the stand-by losses are not nearly so heavy as with similar size steam stations, indeed, for any size of steam station. The small stand-by losses of a gas plant are very noticeable as compared with steam, and a fire can be kept in a producer for a week without any serious fuel consumption, and can be started up at any time with load on the engine in ten minutes to half-an-hour, according to the size of units. I have started up a producer giving 1,500 horse power in this manner in half-an-hour from the commencement of blowing, full load being put on the engines at the end of that period. Gas producers respond to great variations of load without any difficulty, and I have seen, even with very large loads, a load increased from 500 h.p. to 2,000 h.p. almost instantly without any appreciable falling off in the quality of the gas, this variation of load being taken either up or down the scale, as desirable. Of course, to do this requires that you should have a good producer, and that proper provision has been made to allow of such fluctuations; but the fact remains that it can be done, and can the same be said of any steam stations with any provision whatever?

#### Results Obtained.

My firm recently supplied three sets of 55 K.W. gas dynamos and suction plants for Calcutta for central station work, and the official tests came out at .02 lb. of coke per b.h.p. per hour. The thermal efficiency obtained in actual work at the engine crankshaft was 22.71 per cent. of the heat in the fuel. Since that day, however, improvements have been made, and in a recent test the actual thermal efficiency obtained was 26 per cent., that is to say, 26 per cent. of the heat value of the coal as actually received was converted into useful work at the crankshaft. It is a well-known fact, that increase of the compression of the charge before ignition on an "Otto" cycle gas engine gives greater economy, but the difficulty has hitherto been that if such compression was increased beyond a certain limit that what is known as pre-ignition took place, that is to say, the gas was ignited prematurely before the end of the compression stroke, with the result that great strains were put on the working parts of the engine with disastrous results. To overcome

this my firm experimented with what is now generally known as "water injection," that is to say, a little water is admitted to the engine during the suction stroke of the cycle, with the result that this water is converted into steam, partly during the suction stroke and partly during the following compression stroke, with the result that the temperature of compression is considerably reduced, and it is so possible to greatly increase the compressions. My firm have now made a great number of engines having a compression of 200 lbs. per square inch, and the economy obtained has beaten all previous records. On tests which have been authoritatively recorded, it has been proved that a thermal efficiency of about 32 per cent. can be obtained, that is to say, 32 per cent. of the heat value of the gas admitted to the engine cylinder is converted into actual work at the crankshaft, being 20 per cent. to 25 per cent. more economical than previous practice.

Those who would like further details of these authoritative tests together with other information concerning them should refer to the paper which I had the honour of reading before the Manchester Association of Engineers about twelve months ago.

Slide 4 shows a view of a set as photographed in our works.

Slide 5 shows an installation at West Hartlepool for public electric supply of a capacity of 300 B.H.P. which drives two engines each of 135 B.H.P. capacity.

#### Various Types.

Other types of producer gas plants are made, and in some cases are better than suction gas plants. A producer gas plant can be made to work on pressure whatever the fuel, and works very satisfactorily under such conditions; and it is desirable for some conditions of load that this be done, and it should be understood that the suction plant is not by any means a universal necessity. All the types of gas plants I have designed for power purposes work on the regenerative principle, that is to say, the heat of the gases leaving the gas producer are recovered by regeneration, either in the form of steam or in superheating the air and steam on its way to the gas producer.

It will be understood then that a pressure gas plant may have all the advantages and economies of regeneration without being a suction plant. Of course it is very nice to be able to dispense with any special apparatus and for the engine to automatically take gas as it wants it from a small gas producer, but unfortunately if this is done, the choice of the fuel is very limited. This does not matter for small powers but for large powers; if we are to compete successfully with the steam engine, it is necessary for any kind of fuel to be used indiscriminately.

#### English Bituminous Coal.

When using English bituminous coal it is not possible to work on the suction principle, and although I have heard at various times of suction gas plants for bituminous coals, I have found that such with English fuels are unworkable. The chief difficulty when using bituminous coal is the condensable hydrocarbons or tarry vapours which are given off, from which the gas has to be thoroughly purified before being fit for use in the gas engine; also most of the fuels in England take very hard together when heated, with the result that the solid bed of fuel necessary for good gas production is not easily obtainable, and a special design of producer is wanted.

I have done a great deal of experimental work in connection with the use of common bituminous coals during the last few years, and my firm are at present selling a gas plant to use common bituminous coal for power gas purposes. They are necessarily, of course, more expensive than the simple suction plant, so that it does not pay, as a rule, to use them for any powers less than about 100 h.p., but above that power in a great many places in England, it is desirable to use the local bituminous coal. Slide 6 shows a general arrangement of such a gas producer plant, from which it will be seen that the gas producer consists mainly of:—

- (1) The gas producer.
- (2) The air saturator and hydraulic box.
- (3) The gas coolers and washers.
- (4) The centrifugal tar extractor.
- (5) The gas purifier.
- (6) The auxiliary machinery, consisting of an air blower and a circulating water pump, and the arrangement for driving these and the centrifugal tar extractor.

Slide 7 shows a section of the gas producer. It will be seen that it is different to that used for suction gas plants. In the first place it is very much greater in depth and diameter, and in the second ample facilities are given to ensure that the fire is always solid. Such a producer can be worked for months at a time without stopping, the lower portion of the producer being sealed in water so that the ashes may be taken out at any time without interfering with the gas production. The gases leaving the outlet shown, enter the saturator, which, as you will see, is arranged after the fashion of a multitubular boiler, the hot gases passing through the tubes being cooled by the water surrounding them and the sensible heat of the gases is converted into steam necessary for the gasification of the fuel. The gases leaving the bottom of the saturator pass through a hydraulic seal, the object of which is to provide a kind of safety valve so as to prevent backflow of gas, if for any reason the airblower stopped working. The gases leaving this apparatus at about 100 degrees Centigrade enter the foot of the gas cooler shown in Slide 6. This consists of a cylindrical vessel fitted with suitable filtering material such as coke, and the upper portion being arranged in the form of a perforated plate which is covered with water. The gas is



made to enter these perforations and to bubble through this water, and a great portion of the tar is removed here. The water is circulated down the tower in the opposite direction to the gas, and this water is circulated continuously by means of a circulating water pump. The gas leaves the top of the cooling tower at atmospheric temperature, and enters the centrifugal tar extractor shown in Slide 8. The function of this tar extractor is to throw out of the gas the light tars, which are otherwise difficult to remove, by centrifugal force, a little water being admitted at the centre which washes out these light tars into a water sump arranged at the foot. It will be seen that the gas entering at the centre passes through a number of plates arranged on a rotating disc inside the extractor, by means of which the gases are whirled round at a high speed and outwards to the periphery. All solid matter and the water are thrown by centrifugal force to the inside edge of the casing of the tar extractor and is so washed by the water to the tar exit pipe. Now, to increase the speed of these gases requires a certain amount of power, and the special feature of this tar extractor is that these gases passing from the periphery of the disc come in contact with blades arranged on the opposite side of the disc, the energy previously expended in bringing them to a high peripheral speed being recovered in turbine fashion. The gases leave the outlet of the tar extractor at the same speed they entered on the opposite side, and it will be seen that the only energy that is lost is that of friction of the gases through these blades; this is very small indeed, and it has been found in practice that to drive such a tar extractor for dealing with the gas for 1,000 h.p. in gas engines requires only 2 B.H.P. The gases leaving the tar extractor are practically free from all solid matter, and are next conducted through the gas purifier, which is arranged in the form of a number of layers of filtering material such as sand, dust or oxide of iron, which takes out any water carried in suspension or light oils which may have escaped the tar extractor. The gas leaving the purifier is then conducted away to the gas engines. A gasholder is not required for this plant.

Plants of our design have been constructed from 100 h.p. to 3,000 h.p., and there are about forty of them working in this country at the present time. My firm have several under construction of several thousand h.p. capacity each, and there is likely to be a great demand for them for all industrial purposes, including that for electric lighting and power.

#### Gas Power for Central Stations.

During the last twenty years my firm have fitted something like fifty central stations with gas power, these being mostly on the Continent. For various reasons the use of gas power in England has not been much encouraged for electric light stations. This is probably due to the fact that fuel is comparatively cheap as compared with some Continental countries, and any saving in fuel is naturally more keenly felt where fuel is expensive. A doubt also exists in the minds of most electrical engineers as to the reliability of gas power, and there has been great difficulty in the past. This has been due to a combination of circumstances, but electrical engineers to-day may, with the progress that has been made, and especially during the last five years, safely assume that gas power for central stations is going to stay.

#### The Mond Process.

If powers are wanted above 3,000 h.p. capacity it pays to put in an ammonia recovery plant obtaining from the coal the original nitrogen present, in the form of sulphate of ammonia as a by-product. Most of you are aware of the Mond process for such a purpose, but there has been a difficulty in persuading engineers to use this apparatus, chiefly because of the high first cost and complicated system. I have been experimenting for some time past in this direction myself, and my firm have put down an ammonia recovery plant of 3,000 h.p. capacity for this purpose. Now, the chief objection to the Mond process has been the large cost of the apparatus, the poor quality of the gas produced, and the complicated nature of the plant. The problem I had to face with this plant was to reduce the capital cost very considerably and to produce a gas of higher quality than was usual, and I am glad to say I have been able to do this, with a plant, which will cost considerably less than the Mond, whilst the gas produced is of a value of 165 British thermal units per cubic foot, which is a very rich producer gas indeed, far higher in value than any from suction gas plants or the like. This will affect the total cost of power gas installations in another direction besides the first cost of the producing plant; the size of the gas engine necessary for a given power being less than that necessary for the Mond process, so that the inducements to go in for recovery plant will be greater than existed before, and although I state the present limit of the size of the plant as 3,000 h.p., I am of opinion that it will pay eventually to put them down of as low a power as 1,500 h.p. capacity. The larger the plant, of course, the better it pays, but there are not many demands for plants exceeding 3,000 h.p., and the extension of the possible limit to 1,500 h.p. should make an appreciable difference in the number of installations which will be eventually put to work.

I am glad to say, also, that the same alteration of design which has produced the richer quality of gas from these ammonia recovery plants has also increased the yield of ammonia, and consequently also the commercial efficiency of the whole system. In a very great many cases the value of the by-products will be sufficient to pay for the first cost of the coal, and this means that the only charge for obtaining the power would be the interest and depreciation charges together with that of labour, which should enable the power to be obtained at rates far below

those which have up to the present been possible. Slide 9 shows a general view of such a plant.

I am of opinion that the only way the electric supply companies can meet the competition of the small engine and suction plant is in this direction. A factor in the situation is that a small gas engine is just as economical as a large one, and it is for this reason that suction gas plants and gas engines are making such advances in what one might call the preserves of the electric supply companies, because of the fact that they can generate power at previously unheard-of prices. Owing to the introductions of these small gas power combinations, the inherent advantages of central stations, in which they relied on the superior fuel economy of large steam units and an equalising load factor have been very seriously undermined. It seems to me that taking into consideration that the majority of these small suction gas plants use expensive coal such as anthracite the only way in which electricity supply stations can meet the competition is by adopting the same source of power as these competitors and using cheap fuel combined with means for obtaining the by-product sulphate of ammonia from the fuel. The price at which current could then be distributed would I think, place large electric supply companies out of the reach of such competition. I need hardly repeat that on its merits the suction gas plant and engine have come to stay under some such system as I have described ultimately replaces them in the same manner it was intended that large electric supply companies should replace the small steam plants of the smaller power users in their districts.

#### Irish Coal Supply.

In mentioning ammonia recovery plants, what has been said, so far, refers to experience in England, but I propose to deal later with the question as applying to Ireland. The majority of the coal used in Ireland is imported. This is due to the lamentable fact that the fuel supplies of Ireland have not yet been worked to any great extent.

From statistics which I have collected from the Report of the Royal Commission on Coal Supplies, it would seem that the quantity of coal being raised in Ireland is decreasing. Whereas in 1895 the total quantity of coal raised was approximately 125,000 tons in 1904 the quantity was not more than about 105,000 tons. Yet, according to the evidence of Professor Edward Hall, given before the Commission, there is good coal available in County Tyrone, in Kilkenny, Queen's County and Carlow, in the south; in Connaught and in Antrim. It would seem that the total coal available in Ireland, as far as can be judged, amounts to something like 174,458,000 tons. Most of this is soft coal of the bituminous kind, but there are extensive deposits of good anthracite fuel in Kilkenny, Queen's County and Carlow, and I have used some of this coal in producer gas plants with satisfactory results. I have previously stated that an anthracite suction plant is very simple, and, because of this, it is necessary that the fuel used in it should be carefully chosen and of a fairly uniform size. When imported from Wales it can be obtained in this condition, as the colliery owners have found it pays them to put down washing and screening apparatus, but unfortunately this has not been done in most of the anthracite collieries in your country. If this was done and reasonable railway rates could be obtained there is no doubt that a good deal of the anthracite coal used, at any rate in the South of Ireland, would be from your own coalfields.

#### Peat Fuel in Ireland.

A valuable national asset possessed by Ireland, although it has not as yet been tapped to any extent, is the extensive deposits of peat. It would seem that there are something like 2,850,000 English acres of bog land in Ireland of an average depth of about 20 ft. It contains a great deal of moisture, which is generally about 90 per cent. by weight, but it is possible to dry this commercially and reduce the amount of moisture to something under 30 per cent. by weight. Peat is an ideal fuel for gas producers, but when used for steam boilers and the like it does not do so well. The conditions of working for gas producers are entirely different to that of an ordinary fire, and from experiments I have actually made I am of opinion that it could be used very satisfactorily for gas power. According to the evidence of P. Dvorkovitz, President of the Petroleum Institute, there are 7,440,000,000 tons of dry peat in Ireland, having a calorific value of 12,000 British thermal units per lb. when perfectly dry. As it is difficult to obtain it dry, it can be assumed that the actual calorific value obtainable in actual work would not be more than 6,000 British thermal units per lb. weight, or 2 lbs. of peat are equal in value to about 1 lb. of bituminous coal. If peat could be obtained close to the actual place of power production it would pay to gasify this in plants from 100 h.p. capacity upwards, but, unfortunately where the majority of the peat can be obtained there are at present no requirements for power, and how to take advantage of this vast wealth of fuel is rather a difficult problem.

#### Peat Experiments.

I have been making lately a great many experiments with this peat, and this, together with evidence I have collected from various sources, prove conclusively that the majority of the peat in Ireland contains a large proportion of nitrogen in its composition. The proportion of nitrogen on the dry fuel varies from about 1 per cent. by weight up to 2 per cent. by weight, the average being about 1½ per cent. It has been proved that this peat can be successfully treated for the recovery of the original nitrogen in the fuel in the form of sulphate of ammonia, and this being the case the outlook is altered considerably in my

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WELL FARM, WICK STREET, PAINSWICK.



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opinion, as if treated on a large scale the by-products obtained from it are very valuable. Indeed, from the figures which have been published, it seems to me that it would pay to treat the peat for the recovery of ammonia and other products alone. There is already a process at work in the country, at Kilberry, in the North of Ireland, from which it would seem that the process employed by the Irish Peat Co. works out somewhat as tabulated below.

By distillation of 100 tons of peat at Kilberry, North of Ireland, four miles from Athy, by Mr. Reece's process, the Irish Peat Co. obtained the following:—

1 ton of sulphate of ammonia	...	...	£12
1 ton of acetate of lime	...	...	9—10
50 gallons of naphtha	...	...	12—10
300 lbs. of paraffin	...	...	15
300 gallons of volatile oils	...	...	15

£64

Cost of production—peat, acids, labour, etc. £32

It is evident that the gentlemen working this process are treating the wet fuel, but I am of opinion that the peat could be subjected to a simple process of air drying by fan blast as collected, before used for gas producer work, and as in practice it is possible to obtain 75 per cent. of the original nitrogen in the fuel in the sulphate of ammonia, a large plant making producer gas with recovery of sulphate of ammonia would be a very remunerative investment. Peat containing about 30 per cent. of moisture is very easy to obtain if subjected to the air drying process, and the weight of sulphate ammonia obtained from a ton of such fuel would be approximately 1 cwt. In addition to this there would be produced gas of the equivalent of about 1,000 h.p. hours from the same weight of fuel, so that it will be seen that vast possibilities are opened out from the fact that power could be obtained from this peat for nothing, that is to say, a plant put down on such lines would pay as an investment for the recovery of the by-products without taking into consideration any power gas at all. As you are aware, there are a great many processes in existence which require cheap power, such as in the production of aluminium and other electrolytic purposes.

#### Power Derived from the Bogs.

In most of the districts where peat bogs are situated very cheap labour can be obtained, and in my opinion it is certainly practical for such Companies to transport their works to the midst of the Irish bogs so as to obtain the cheap power, much in the same way that Aluminium Co.'s and the like are building their works near waterfalls. The cost at which power could be obtained in Ireland under these circumstances would be cheaper than from any waterfall, and it seems to me you would get industries brought into the country which could not but tend to its welfare and wealth.

#### To Stem Emigration.

The employment found for the Irish people stem the tide of emigration from the country, and, what is perhaps more valuable still, the land from which the peat is taken would be gradually converted for agricultural purposes. It is quite true that substantial drainage schemes would be necessary, but with power obtainable at such a cheap rate this would present no substantial difficulty. Below is tabulated an estimate of the cost of production with such a plant consuming 10 tons of peat per hour.

**Estimated Cost of Working an Ammonia Recovery Plant Gasifying 10 tons of Peat per hour for one year of 8,500 hours.**

#### CAPITAL CHARGES.

Cost of Ammonia Recovery Plant, including boilers	...	£35,000
Air drying plant	...	2,000
Trolleys and rails for collecting peat	...	5,000
Total capital cost	...	42,000

#### EXPENDITURE.

Interest and depreciation at 10 per cent.	£4,200
Repairs and maintenance at 2 per cent.	840
Labour on plant	2,000
Lighting, lubricants and stores	1,000
Labour collecting peat, and drainage	4,000
Management and office expenses	1,500
Cost of acid	6,000
Royalty on peat at 1s. per ton	4,250

Balance	£23,790
	27,216

Total ...£51,000

#### RECEIPTS.

4,250 tons of sulphate of ammonia at £12 per ton	£51,000
--	---------

Total ...£51,000

It will be seen that the by-product taken into account is sulphate of ammonia, but it would appear from the results obtained by the Irish Peat Company at Kilberry that there are other valu-

able by-products present in the peat and these could no doubt be recovered. Even excepting these, I estimate the profit on such a plant at approximately £27,000 per annum under the conditions above stated, and in addition to these there is available hourly producer gas equivalent to approximately 10,000 h.p. hours.

#### Electrification of Railways.

It is not necessary for me to point out the innumerable purposes for which cheap power would be suitable, but I think that the electrification of the railways of the country would not be a difficult matter with such cheap sources of power. Some of you would no doubt see at the last Cork International Exhibition some growing crops, the soil on which they were growing having been treated by sulphate of ammonia, and the excellency of sulphate of ammonia as a fertiliser has been placed beyond all doubt by various agricultural authorities, and if the country became a producer of such fertilisers it is only natural to expect that a portion of them at any rate could be used on the land from which they originally sprung, and what are now called "waste lands" would be great sources of wealth.

#### Other Developments.

I should like to mention some other developments in which gas power is likely to be prominent in the near future. One of these is in the propulsion of barges for the canal traffic of the country by means of suction gas driven sets.

Slide 10 shows such a combination which my firm are building at the present time for one of the chief carrying companies on our English canals and which will be shortly at work. Amongst the many advantages which are likely to accrue from this system are the very cheap fuel costs, the small space required for the propelling plant and the small bunker space necessary for the fuel. The weight of such a set is also less than is possible to obtain by a steam-driven barge.

#### Gas Driven Canal Barges.

After consultation with some eminent authorities on canal traffic, as far as I can see, gas driven barges are likely to eventually replace horse haulage on canals, whilst the cheap transit of goods would be a help to the industries of the country. In a great many cases, in England at any rate, one difficulty met with in canals is the shortness of water during the dry season, but it might be possible for the water obtained and extracted from the peat of Irish bogs to be used to supply a canal system through the country, which would open it out in a very effective manner.

Another direction in which developments are now proceeding is in the application of the internal combustion engine and power gas plant for marine purposes. We have been into the question quite recently, and my firm at the present time are designing a gas engine about 600 h.p., together with a producer plant, to use either bituminous or anthracite coals. This combination will be fitted in a tramp steamer of 2,000 tons capacity, and is intended for general trading purposes. A great many problems require to be solved in such an application, but we are confident that the application will be successful, and the fuel consumption should be not more than one-half that of the best steam practice at present in use. Other advantages are that the weight of the gas combination is considerably less than steam of the same power. The bunker space required is much smaller, and the labour required for stoking is reduced. If these applications are successful, the question arises how far such applications would be applicable to warships. One of the greatest advantages of such an application would be the distance the warships could travel without coaling. This should be more than double—a very considerable advantage in time of active service. I should like to have mentioned other developments in various directions, which have been or are being applied, but as time presses these will have to be omitted. Obstacles which have previously stood in the way of the advance of the internal combustion engine are from time to time being removed, and I am confident that in the near future the internal combustion engine will replace all other prime movers whether on land or sea.

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## OUR NORTHERN LETTER.

(FROM OUR CORRESPONDENT).

The Exhibition of Modern Paintings in Belfast, projection of which I announced some time ago, will, when these lines appear in print, be a thing accomplished. There are so many considerations behind, and before, this movement, that I must claim the indulgence of IRISH BUILDER readers, if I fill my column with it, because we, here in the North, hope, and warrantably so, that this Exhibition may prove an historic event—as the visual crystallisation of forces that will make history. A century ago, Belfast was eminently cultured in literature and the arts—but the culture was of an aristocratic minority. With the coming of commerce the aristocratic circle was broken, and with the development of commerce the artistic side of life banished. But now the pinnacle of success has been reached. We have built up a city of great undertakings. We have revolution-

one of the most eminent of its students—Mr. John Lavery—is himself a Belfastman. In Alexander Roche and S. Henry, Irishmen both, it numbers two other eminent students. And to enumerate only a few other Irishmen eminent in English art, it numbers two other dominating it, are there not Mark Fisher, Wm. Orpen, C. H. Shannon, and J. J. Shannon, R.A.? This list alone shows we have no lack of the highest material. What we require to provide is the *milieu* that will develop and keep at home this material, so that celebrity may come to the land of its birth, rather than, as at present, to the land of its forced adoption. Never, in any city, was gathered together such a representative Exhibition as will be open in Belfast for



Illustration by courtesy of Messrs. W. &amp; G. Baird, Ltd., Belfast.

The New Presbyterian Church, Letterkenny.

ised the shipping of the world—and that alone is no mean achievement. No city has our linen trade. We have the greatest tobacco and rope-making industries. But the condition of reaching all this was that everything not severely utilitarian had to be sacrificed. As a consequence, we have little of beauty for beauty's sake. In the bulk our architecture is deplorable—all Queen Anne front and Mary Anne back, as one critic has put it. But the generation of men who created our commercial greatness is passing away, and a generation bred in ease coming. In our new City Hall, which is unsurpassed, as an architectural mass, by any in the kingdoms, we have the first embodiment of the newer order—utility attained with beauty. So, in the Exhibition of Modern Paintings, we have the embodiment of loveliness in form and colour for its own sake. Our hope is that the Exhibition will bring home to the North of Ireland its artistic shortcomings, and produce an awakening that will broaden over Ireland. We have the example of Glasgow to strengthen our hope. Its famous school has drawn much of its best material from the North of Ireland; and

a month from the 20th of April. And the honour of organisation and pronouncement of such an Exhibition belongs to a gentleman of Dublin—Mr. Hugh P. Lane, who, by his service and untiring efforts, has put us under an obligation which we may be able to acknowledge, but which we can never suitably discharge. Among the artists represented are: C. F. Watts, J. M'Neill Whistler, Courbet, Corot, Orpen, Lavery, Leighton, Monet, Manet, Degas, etc. Our gallery accommodation is unfortunately small, and will barely suffice to hold the wealth of work. Public support of the movement is thorough. Over £800 has been subscribed to the Guarantee Fund at the moment of writing and it will not be closed until £1,000 is reached. It is hoped that, perhaps, some of our wealthy merchants will purchase some of the pictures for presentation to the city. Mr. Lane very highly appreciates the enthusiasm he has met with in the north. And, if the Exhibition proves the success it is hoped to be, it will become annual. All in Dublin who can possibly afford to come north and visit it should let nothing prevent their doing so.

## THE ARCHITECTURE OF THE COTSWOLDS IN THE 16th AND 17th CENTURIES.\*

The domestic architecture of the Cotswolds has an interest all its own, and although I have, from time to time, in the pages of our Journal, made many of my audience familiar with its features, this is the first time I have had an opportunity of explaining its merits and details to the members of this Society.

I may, therefore, be pardoned if I reiterate some things which I have written and refer to remarks of others who have gone over the same ground as myself.

The keynote of the architecture is its simplicity, and this simplicity arose to a large extent by reason of the isolation from the world that the district enjoyed, an isolation which exists in some parts even to this day, railways and other means of locomotion notwithstanding.

This simplicity was to some extent a necessity of the case, as only local materials were available, and these, although abundant, were few in variety.

The staple was stone, good, plentiful, and quarried on the spot. The oolite formation stretching right across the district provided for all necessities. Everything that could be improvised from this material was so done. Stone was used for walls, floors, roof coverings, chimney stacks, and chimney openings.

The only other material was wood, also plentiful, but of the hard variety and consisted mostly of oak, chestnut, and beech. Of soft wood there was little, consequently we find that the joiners' work was confined to doors and panelling. The window openings had the glass glazed directly into the stone mullions. Iron was scarce and confined to hinges and casements. Lead had to be procured from a distance, and therefore, was not available for roofs or flashings, but confined to the setting of the window glass. This dearth of lead was obviated by the omission of all hips, and the roofs were carried through to gable ends, and thereby produced the leading feature of the style and gave it its character. It is this grouping of gables that gives it its charm, and is a result of this limit in the variety of the materials available, but we shall see that in spite of the absence of lead, the roofs were made sound and watertight, and the water was conveyed away from the roof in a more or less satisfactory manner.

It is to the mason, therefore, we must give the first place, and right well he deserves it; the skill and cunning of his craft will be abundantly evident in the views I shall place before you.

It has been urged by some writers that these stone walls, although of ample thickness, were imperfectly bonded, and the interior was not solid, but contained a good deal of loose material. So far as the latter assertion goes, it is undoubtedly true, but it must be remembered that lime was difficult to obtain and had to be sparingly used and confined to bedding and pointing the stones; a prodigal use of mortar was prohibitive by reason of its scarcity, lime had to be made by a process of burning, the only fuel available was wood, and the process was long and tedious; but it must be admitted that, although the walls were not altogether solid, yet the masons abundantly made up for this deficiency by reason of the excellent jointing of the stonework, which required little help from the cementing material, as many drystone walls can testify.

The keynote of the style, as before remarked, was simplicity, and if you will notice the diagram on the screen, you have in that one drawing all the elements of the Cotswold style, which you will find exemplified in infinite variety in the subsequent views.

It will be observed that it is a transition from the Tudor style of the previous century, adapted to the material and the needs of the inhabitants. The landowner's occupation was the rearing of sheep, the wool from which was his means of living, and although he prospered considerably, yet a certain economy was desirable in his building operations, and there was little circular work or superfluous ornament; plain solid lintel and mullion was all he could afford.

You will, however, notice the exquisite proportion and the relative area of voids to solids, the diminishing num-

ber of openings on each successive floor terminating in the eyelet in the apex of the gable.

The string courses and labels were identical, always about 6 in. deep, splayed and hollow moulded.

The mullions were varied in section as time proceeded, originally hollow, then chamfered, and finally ovolo moulded, but always the same proportion.

The openings were from 15 in. to 16 in. wide, and the height varied from 3 ft. 6 in. on the ground floor to 3 ft. in the gable and sometimes 3 in. less.

The gables, so marked a feature in the style, were set at about an angle of 52 degrees. In the minor buildings, the roofs were carried over the walls, and we shall see examples of these, but the more important buildings had copings, the section of which was varied, sometimes flat, as in the example before us, but more often in the earlier examples moulded. These projected over the walls just above the slates, and the space so formed was pointed up, and so obviated the necessity for lead or other flashings. A gablet or finial of stone made an appropriate termination.

The chimney stacks were also a prominent and ornamental feature, rising squarely and solidly through the roof; they were terminated by a hollow string course, and the flues were in most cases carried up separately and diagonally, forming in the process a pyramidal stopping to the base of the shaft and terminated by a moulded cap, the detail of which became more elaborate as the Renaissance influence became stronger. The stone weathers were worked on the base of the shaft should be noted, coinciding with the pitch of the roof, under which the stone slates were tucked and pointed, and again the necessity of lead flashing was obviated.

The roofs had to be strongly framed and pinned to support the heavy covering of stone slates; these slates were obtained from certain beds of the oolite, by exposing the blocks of stone to the action of frost, causing them to split up into laminations of the required thickness; these were shaped and sorted into a variety of sizes, the larger ones being used at the eaves and diminishing in size to the ridge; one or more holes were drilled in each slate, into which an oak or deal peg was driven; it was then hung over the tile batten, the under side between the rafters was plastered with coarser plaster, and made a sound, warm, lasting, and watertight covering.

The valleys were formed by rounding the bed and cutting and shaping the tiles to fit the hollow in a very ingenious manner, that no leadwork was required. The covering to the ridge was made from the ubiquitous stone, so that the whole externals of the building were indebted to the quarry for their being. But the charm of these old stone roofs, which in a few years became covered with lichens, must be seen to be appreciated, and one regrets that times have so changed that this style of roof is going into desuetude, owing to cheaper and baser materials being adopted.

A word, perhaps, might be said as to the entrance doorways; these had as a rule a deep stone lintel, over which the label or string was carried, and the sides and head were either chamfered or moulded according to the relative importance of the doorway, or the character of the building. The jambs and head were rebated for the stout cross plank door which was hung to strap hinges on to hooks let into the stonework.

Porches were not as a rule a feature, but at a later period these were added to the main building, and very charming and appropriate some of them are. Wooden porches of a Renaissance character have at times been added. To several of the examples which will be seen the simple doorway appears to have been removed by a subsequent owner, perhaps a well-to-do clothier, who, not content with the modest doorway provided, had introduced one of classic proportions.

These alterations were not always confined to the doorways, but when an addition was required to the building one was made, not in the old simple style, but in the prevailing taste of the time. This, of course, makes the building more interesting historically, but detracts from its harmony.

If the prevailing note of the exterior of these old buildings was simplicity, the interiors also showed the simple life lived by their inmates.

\* A paper read before the Society of Architects by Mr. Ellis Marsland, Hon. Sec.



The prevailing plan is a parallelogram, surrounded by stone walls, divided up by wooden partitions into more or less square rooms, and one marvels in these days, even in the largest of the houses, at the absence of minor offices. Other buildings were L shape in plan, others H, but all are wanting in the modern ideas of comfort and privacy. One room opening out into another, and doors opening straight into rooms, but when we read from the pages of the immortal Pepys that it was quite usual to pass from one room to another, and even to interview a lady or gentleman, while he or she was in bed, and when also it was customary for the respective guests at a wedding ceremony to see the bride and bridegroom safely to bed, one ceases to wonder at the limited attempts at convenient planning, in these unsophisticated times. I am afraid I cannot hold up the plans of these Cotswold residences as examples to be followed by our students. Yet they were comfortable enough so far as the individual rooms were concerned. The thick walls provided convenient window seats, and the wide and deep chimney opening suggests warmth and comfort. Here again, the local stone is in evidence and provides the material for the principal decorative feature of the interior. Wood was the only fuel, and the openings were wide and high. The limit of the length of stone obtainable made a compromise necessary between the lintel and the arch; therefore, we find a flat four-centred arch spanning the opening, yet not an arch, but formed of two pieces of stone acting as cantilevers with a vertical joint in the centre, and a wood beam above tying the whole together. The jambs and head were simply or fully moulded according to the position or the importance of the building, and some examples will be seen in the views presented. These old openings in later times were filled up and modern stores and chimney pieces inserted, attended subsequently by disastrous results, when coal became the prevailing fuel, soot accumulated, and the beams being dry brought about a catastrophe and deprived the present generation of many an interesting specimen of this old time architecture.

The floors of the interiors were carried by stout oak or chestnut beams appearing below the ceiling, and with splayed or moulded edges appropriately stopped. Heavy wood lintels were placed over the window openings into which the floor beams were framed, thus binding the whole house together.

The walls were either plastered or panelled in oak according to their relative importance, and the floors were laid with oak or chestnut planking, or being on the ground level were paved with stone.

The use of ironwork was limited, yet one comes across some charming remains of casement stays and fastenings. Iron strap hinges and door knockers which are simple and effective and redound to the credit of the old craftsmen, whose delight and interest in their work was unbounded, and in later times was developed and encouraged by Italian influence and forms.

The old window glass and lead glazing added a charm to the openings in such parts as it has been permitted to remain, but, as will be seen, the modern sash and frame or casement has usurped the space occupied by the mullion and glass in the craze for change.

This old Cotswold style lasted for about 100 years, and gave place to the Renaissance which eventually penetrated this remote district. Its coming was heralded by certain alterations being made in the old work, and subsequently when new buildings were erected the old style was given up and new forms took its place. This was inevitable. The old had its limitations in the height of its rooms which rarely exceeded from 7 ft. to 8 ft. The craze for lofty rooms, to meet the prevailing fashion, could not be met, except by altering the whole proportion of the architecture, so it went. From that time to this, fashion in architecture has ruled, no settled style has developed, but revivals are the order of these later days.

The study of this Cotswold work, which was honest and true, may lead to its revival as it has in it all that is necessary for those who are content with simple forms, and in the hands of a sympathetic architect may yet renew its youth.



## ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

### Shrewsbury.

Mr. Webb's instructive and amusing paper was listened to with much interest; and illustrated as it was, by snapshots taken by the members who joined the excursion last year, and including many views of the same in all places, combinations and attitudes, it was quite a change from the study of the art and science of architecture which in some shape usually forms the matter for consideration of our general meetings.

### Photographs.

A suggestion was made, and, we think, a good one, that there should be one or two of the photographs of members attending the excursion each year enlarged and framed to place upon the walls of the rooms. A good deal of personal interest which is now lost would then be continued, and it might possibly increase the popularity of the excursion itself.

### The Excursion.

Just now arrangements are being made for holding this year's trip; and the matter needs a good deal of consideration in order that the place and the cost may be acceptable to a larger number of members who have joined for the last four or five years. There is a strong feeling that more profit and instruction would be derived by going to some part of England than anywhere in our own country, where the buildings are of more antiquarian than architectural interest—and it is found that the cost of the former would be only slightly in excess of the latter. Amongst the places which have been mentioned so far are Oxford and Northampton.

### Water Colour Sketches.

Some of the sketches by Mr. G. G. Lynes, which were hung on the walls for the "Shrewsbury" Lecture, are most delightful, and it is very gratifying to think that such good work can be turned out by some of our members. Mr. Lynes has the faculty of importing a good deal of "atmosphere" into his drawings; there was one especially, a scene at the mouth of the river, which fairly shone with sunlight, and yet was not in any way untrue or unreasonably impressionistic.

### The Water Colour Club.

We do not know if this club will be carried on through this summer. It deserves better support than has hitherto been accorded to it. Mr. Lynes, who has for years been the moving spirit in this respect, is at present in Spain (probably covering yards of "Whatman" with glorious colour), and we hope he will consent to try again on his return. In the meantime, we would suggest that any member who wishes for the carrying on of the club would write to the secretaries promising his support.

In our Engineering Items of our last issue we made reference to Mr. Thomas Ridgley's excellent paper, read before the Engineering and Scientific Association; in our remarks, we in error quoted the title of the paper as "Millions in Irish Bogs." The title was "Power Gas Plants; their present application and future possibilities, with special reference to Ireland." It is quite true that in the course of the paper, and in the animated discussion which followed, it was suggested that there were "millions in Irish bogs."

## THE ROYAL DUBLIN SOCIETY'S SPRING SHOW.

The Annual Spring Show, under the auspices of the Royal Dublin Society, was opened on Tuesday, and closed yesterday, after an apparently successful course. The machinery section was, as heretofore, a great attraction, and though not containing much in the way of novelty, was none the less of interest to any student or business man in search of an up-to-date plant. There being but few novelties, our task is thereby lightened in respect of the chronicling of such as there were. Of interest to contractors were steam engines by Messrs. Clayton-Shuttleworth, Ltd.; John Fowler and Co., Ltd.; Aveling and Porter, Ltd.; Ransome, Simms, and Jefferies, Ltd.; Hornsby's, Marshall and Co., Thomas Green and Son, Ltd., Burrell and Co., and an assortment under the auspices of the well-known Irish firm of T. Thompson and Son, Hanover Works, Carlow.

Messrs. Grainger Brothers, Hollywood, Belfast, showed a road contractor's men's sleeping van, with day and night shelter for three men, and cooking utensils, table and bench, with fitter's vice, cupboard, etc., and also a 200 gallon capacity watering cart. Messrs. Marsden, Leeds, showed a portable stone breaker, having 16 in. by 9 in. jaws, capable of breaking from 8 to 10 tons of macadam per hour, and for driving by a 4 h.p. engine. In connection with this type of machine, and as illustrative of the great reduction in friction loss in recent years, it is noteworthy that much of this class of plant is now being driven by comparatively light oil motors.

The show of oil engines was much up to the standard of the last two years, though it would seem there is a marked tendency to substitute a self-contained gas producer plant to drive that type of motor, particularly where the load is likely to be a continuous one or the plant a fixture. A very neat and effective type of useful small-powered petrol motor was that shown by Tuck and Co., the well-known engineers, of 19-22 Lower Abbey-street, Dublin. Two of these motors were shown running, the one being fired with a l.t. magneto form of current generator, and the other a l.t. type of electric or battery-produced current. These motors follow closely a well-known American design, and are substantially made and very accessible for dismantling; besides having the further advantage of being combined on a common base with their cooling tank. The makers are Glover and Son, Ltd., Warwick.

#### Producer Gas Plant and Kilkenny Anthracite.

Quite a number of firms showed engines running on producer gas working on the suction principle. Among these may be mentioned such names as the National Gas Engine Co., Ashton-under-Lyne; Kynoch's, Birmingham; Taughey's, Birmingham; Campbell Gas Engine Co., Halifax; and Hornsby's, Ltd., Grantham. Several of these plants were being fed with anthracite from the Castlecomer Collieries, Kilkenny, and on making special enquiry we were glad to learn that coal is considered excellent for the purpose. For such purposes there seems much reason to hope that the future success of this coal-getting venture will be assured. A large number of enquiries are being made into the merits of producer-gas, its economy and freedom from trouble, and we were informed by one of the above-mentioned firms' representative that his proprietors had already some 200 of these installations in use throughout the country. Our informant, in reply to further queries, stated that the working fuel cost of an 8 h.p. plant, basing the fuel cost at 20s. per ton delivered, and with the engine running on a fairly constant load, would not amount to 1d. per hour. He cited the instance of a 16 h.p. plant at Kilkenny which is working continuously at a fuel cost of less than  $\frac{1}{10}$  of a 1d., and as illustrative of the longevity of such plant without skilled attention, he further mentioned one such installation that had been in continuous operation for about two years. The first-mentioned figures as to fuel cost were subsequently corroborated by a similar statement by the representative of another firm. Of the engines used in conjunction with such plant it is remarkable that one and all are fitted with some form of l.t. magneto ignition, and, generally speaking, the details about this part of the equipment seem well in keeping with the makers' reputation for the substantial character of the engine's other details. The larger of the Hornsby engines shown was fitted with self-lubricating bearings by means of rings dipping into an oil well, which is commonly styled the ring-lubrication method.

#### A Petrol-Driven Water Ballast Roller.

A further illustration of the adaptability of the petrol driven, high-speed motor was that furnished by Barford and Perkins' water ballast roller. This machine, which will be found illustrated in last week's issue of our contemporary, the *Motor News*, marks a radical departure from the track of power-driven rollers. It should prove a satisfactory machine to use, being not too expensively priced, very substantially made by one of the oldest and best known houses in the agricultural implement trade—Messrs. Barford and Perkins, Peterboro'—and

adapted as an independent power provider for numerous farm or estate implements of a domestic, agricultural and other useful character. Briefly epitomised, its features include—A channel steel frame moulded to shape, that is to say, narrowed at the point and trussed with bracket-holding cross beams, and at the rear suitable horn blocks for carrying the bearings of the large roller. A feature to be noted in this latter connection is that the style of bearing bracket used permits of a varied weight of roller being easily substituted, whereby the machine may be used for either rough or rolling work proper, or for the lighter task of levelling a lawn or garden path. The roller, being water-ballasted, may be also varied in weight, according to a greater or less displacement of water carried. Volute pattern springs are interposed between the axle bearing blocks and the horn brackets supporting them. The front rollers are made free to pivot about a central pin and against a faced ring, the steering being effected by chains working from either side of a pair of quadrants affixed to the roller axle, and actuated by a worm or nut screw gear, as in traction engine practice. By also pivoting the carrying cross arm of the same rollers the latter are given a free scope of movement in the oblique direction, thus becoming tilted when either end of the roller strikes a too solid obstruction. The water tank is fitted transversely at the rear, immediately behind the driver's back and over the roller. Being of large capacity, no pump is required to assist the circulation through the cylinder jacket, so that the fittings in connection therewith are few in number and of a simple character. A neat foot plate covers the whole of the running or transmission gear, with suitably placed inspection lids of large size, conveniently fitted where required.

The engine is mounted rearwards of the front roller, and has its starting handle placed immediately at the front of the machine, so that the engine drives at right angles to the line of the road axes. This drive is first through a spur gear at a reduction of 8 to 1 on to a countershaft fitted with a bevel pinion at its outer end. This in turn engages with a pair of bevels—one on either side of its axis, which again mesh as required with sliding dog clutches. The drive is thence, by another countershaft fitted with a single chain sprocket, and by Brampton chain on to the rear roller. Two speeds forward and two in the reverse direction are provided, the roller being guaranteed to take a grade of 1 in 7. The actuating speed control is by a hand lever, spring and trigger held, and a cone clutch pedal operated, is furnished to disconnect the engine drive from the gear shafts. Two small hand levers—such as are used on motor cars—are fitted adjacent to the driver's left hand. Similarly conveniently placed is the force fed oiler for the engine, and the steering wheel and brake gear. The latter, it may be stated, is of the block pattern, operated by a screw-on action similar to that used in railway practice, the blocks being pressed against the stout periphery of the back roller. When required a pedal operated countershaft hand brake may also be fitted on request. The petrol tank is circular or bolster-shaped, and is affixed by straps to one of the water circulation pipes. The engine is a standard petrol one, of some 6 h.p., fitted with mechanically worked valves and l.t. magneto ignition, and is governed. The water circulation is by gravity, no pump being considered necessary. The first countershaft has an over-hanging end, to which is fitted a flat belt pulley for utilising the roller as a driving medium for other machinery. The speed of this shaft is about 140 revolutions, so that it provides an effective power medium for the purpose mentioned. One of those machines has been recently supplied to the Earl of Dunraven, K.P., at Adare, Co. Limerick, and the one on show was practically a duplicate of that model. The prices of the machine, which is made in varying weights and capacity, are listed very moderately, but these particulars are readily available on application to the makers.

#### Motor as Lawn Mowers.

On a previous occasion we referred to another useful form of applying petrol high speed motor, i.e., its utility as applied to lawn-mowing purposes. Quite a number of such machines are now in use, and among them is to be noted one shown at Ballsbridge by one of the oldest firms in the trade—Messrs. Alex. Shanks and Sons, Ltd., Arbroath, and London. The machine in question is driven by an air-cooled Simms motor of 2½ h.p., fitted with l.t. magneto ignition, and a chain driven shielded fan for assisted air-cooling. The necessary speed reduction is effected by Reynolds's chains, as is also the one acceleration needed for the cutter spindle. The latter is put into gear by a hand-operated dog clutch, and the cutters are reversible at will. By a simply contrived lever movement the delivery box for the grass cuttings is emptied at the side, the process involving a minimum of delay. The various shafts are mounted in ball-bearings, and the general features of the machine comprise lightness combined with strength and accessibility. The local agents are the Dairy Engineering Company of Ireland, 21 and 22, Bachelor's-walk, Dublin.



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very few people outside the ranks of a very limited number of architects and an equally limited proportion of the more progressive school managers and teachers know much about the matter or have even superficially followed what has been done in other countries. To appreciate the matter perfectly there must be a certain knowledge of the requirements of modern teaching on scientific lines, and on the other hand, the practical details of planning necessary to comply with the conditions involved by such lines of teaching. It seems to us more than a pity that so many of those who argue and debate the education question, including the form of the school structure itself, should not have a better knowledge of the matter, which, after all, is not so difficult to attain, for all that is needed to a moderate knowledge of the question is an acquaintance with the ideas of leading educationalists, and with the manner in which architects in various countries have given effect to these views.

At a time when education is the talk of the day, a work such as Mr. Batsford has lately published—the second edition—is of the highest value. It is entitled "Modern School Buildings," and is written by Mr. Felix Clay, B.A., Architect. It is so short a time since we reviewed the first edition of this invaluable work of reference that it is unnecessary to now go over any of the ground we then covered. The value of the book is proved by its popularity, as shown by the rapid sale of the first edition. The present issue is as completely revised as the progress of matters educational in the interval has called for. As it is largely upon elementary education and schools that recent controversy has centred, it is appropriate enough that the second part of the book dealing with this has been practically rewritten, and particular attention has been devoted to the planning of small and medium sized country schools, a branch of school building that has hitherto been somewhat neglected; and, of course, in Ireland at least, the vast majority of schools come under this category.

Chapters have been added upon infant schools, manual training, cooking centres, and, we are glad to see, upon the alteration and adaptation to modern ideas of old schools; while to the general reader seeking for information, one of the most useful features is a "comparative illustrated survey" of standard plans of the systems of school planning on the Continent and America.

For the reasons we have mentioned, Mr. Clay's book should in Ireland appeal to a very much wider class of readers than is comprehended by the circle of a few architects who are directly concerned with the planning of Irish elementary schools. Admittedly, Ireland is behind the times in the system of elementary education—indeed, Cardinal Logue, in a speech the other day, expressed his belief that the education given to-day is actually inferior to what it was in the even more primitive schools of his youth. Nor can it be said that in school planning Ireland has made the smallest progress during the past forty years, while almost all other civilised countries have completely revolutionised their system of planning. The Irish Board of Works has by its continuance of the system of the gratuitous supply of stereotyped school designs perpetuated an obsolete and extremely ugly type of school, in which the essentials of modern school planning are wholly lost sight of, and architects are deprived of the opportunity of designing elementary schools, and so becoming familiarised with and interested in the practical details of that problem. This further results in the teachers and managers practically ignoring the architectural aspect so long as the requisite number of children can be housed. Even when private architects are employed their efforts are mainly, and generally perforce directed along the old and obsolete lines, changes being mainly confined to the embellishment of the structure exteriorly rather than to the scientific improvement of the plan.

The scheme followed by Mr. Clay in the arrangement of the book is to give first a general sketch of the exist-

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## THE EDUCATION QUESTION AND MODERN SCHOOL BUILDINGS.

The great political question of the moment is the Education Bill, over and around which the fiercest controversy rages. The main question at issue is a religious one, a matter with which we have here no concern; but the advocates of the measure claim that it is based upon the principle of popular control.

Arising out of the same feeling as that which has produced the present Education Bill is a movement to alter the control of Irish Elementary Schools under the present "National" system, substituting a scheme of representative popular management. One of the reasons for this step, albeit but a minor one, is yet that which is of most importance to the readers of a building paper—namely, the allegation that the present buildings are to a large extent unsuitable for their purpose, and unsanitary, in addition to being badly maintained. With the respective responsibilities of the various conflicting parties we have nothing to do, nor with the political or religious aspect.

Now, leaving aside the purely sanitary condition, to say that a given structure is suitable or unsuitable in its planning for the purpose of a school involves a knowledge of what is the best type of plan for the particular case, and in this country, at least, we believe

\* Modern School Buildings, Elementary and Secondary. A Treatise on the Planning, Arrangement, and Fitting of Day and Boarding Schools, having special regard to School Discipline, Organisation, and Educational Requirements, with chapters on the Treatment of Class Rooms, Lighting, Warming, Ventilation, and Sanitation. By Felix Clay, B.A., Architect. With four hundred and fifty illustrations, comprising the plans of 95 schools, and numerous views, details, and fittings. Just published, Second Edition, thoroughly revised and enlarged, with many new plans and other illustrations. Large 8vo. Cloth bound, containing 556 pages, with 450 illustrations, price 25/- net. London: B. T. Batsford, 94 High Holborn. 1906.

ing systems and organisation in schools of different types, with the conditions under which education is carried on, the controlling authorities, etc., together with an account of the working of the various kinds of schools sufficient to give an idea of the uses of the different rooms, their general requirements, etc., comparing similar schools in Germany and America, and finally giving the plans of a large number of recent buildings to show the various methods that have been tried to meet these requirements.

Great care has been taken to treat fully all questions that directly affect the health of the scholars, such as ventilation, heating, lighting, aspect, sanitation, etc.; with this object continual reference has been made to the most recent writers upon School Hygiene, both English and foreign. A special chapter has been devoted to the class-room and its lighting.

In illustrating the buildings, examples are included of all the principal types from important designs recently erected, each design being illustrated and described. Complete plans have been given in nearly every case, not only because it is more interesting and instructive to see the plans of all the floors, but also because it is difficult to judge of the success of a plan without seeing the whole design.

Besides the plans of buildings there are numerous further illustrations, consisting of perspective views, fittings, constructive details etc.

In considering this aspect of the question, namely, the ideal plan, we must remember that in Ireland school planning proceeds upon a wholly different basis to that which has for many years past prevailed in England and most other civilised countries. Here we are, possibly owing in some degree to financial considerations, still wedded to the old time "schoolroom" plan, which practically aims at getting the largest possible number of children into one apartment, the one or two class rooms sometimes provided being chiefly regarded as private apartments into which a very small proportion of the pupils may be temporarily retired for the purpose of receiving some special instruction which it is utterly impossible to give amidst the noise and turmoil of the large general schoolroom, with its five or six different classes, frequently changing position, rather than as the quarters in which the ordinary daily business of the school is conducted. This, too, is of course, to a great extent a teaching and financial difficulty, the schools being small and scattered, the teaching staff available outside the largest towns is very limited, and the only means of maintaining control is in many cases by adherence to the old schoolroom type. We feel certain, however, that in the more important provincial towns—and that in Ireland means anything over 2,500—much might be done in the direction of the improvement of existing schools and the better planning of the new ones, given somewhat increased financial resources. In England and abroad, as our readers of course know, the broad principle upon which an elementary school is planned is that of a series of self-contained and directly accessible class rooms, ranged around a central "hall" or "schoolroom," if the latter word is preferred, this hall being simply utilised for purposes of general assembly or instruction in such matters as drill and gymnastics. Even in countries where the large central hall has not been adopted, the same object is attained by broad, centrally placed corridors—this is notably the case in America and in some of the German schools. Some of the higher grade Scottish elementary schools are exceedingly well planned. In modern schools great attention is paid to the adequate provision of such details as rooms for the teachers, lavatories, cloakroom accommodation, etc.

A typical example of a well-planned large English elementary school is the Denmark Hill School, Camberwell, by Mr. T. J. Bailey, architect to the London School Board. In fact, there is no lack of first rate examples of high class modern planning of all classes of schools in Mr. Clay's illustrations. In regard to small country schools, the author lays it down that schools consisting of one room in which the whole school are taught together by one teacher, should never have accommodation

for more than 50, and as soon as the average attendance reaches 40, or before it, a separate room should be provided for the infants. A very practical way of meeting the difficulty is given in a little plan by Mr. J. T. Blackwell; it consists of what may be described as a large porch at right angles to the main structure—this porch comprises an entrance lobby with cloak room containing lavatory basins. The school proper is simply an elongated right-angled structure divided into three sections, the two end ones each accommodating a class of 40. The teaching difficulty may be met by making the dividing partitions sliding screens, thus enabling one or both of the class rooms to be thrown into the central apartment. The entire internal dimensions of the main structure are about 57 feet long by 19 feet wide, divided in three as aforesaid, and the total accommodation is given at 80 pupils. A similar but much better plan is that for 148 children, also by Mr. Blackwell. The main structure is similarly divided into three, but the entrance porch becomes a corridor running the entire length of the building, and with cloak rooms at either end. Better still is a school for 212, by the same architect; it comes very near to the ideal arrangement for a small elementary school.

We have said sufficient, we think, to show the thoroughly practical character of Mr. Clay's great work. We think a study of its pages on the part of managers, teachers, and architects alike, would result in much good for Irish elementary education, particularly in view of the likelihood of a grant for the purpose of improving elementary education in this country being a probability of the near future.

Mr. Clay's work is of the greatest possible value, and we congratulate him on the phenomenal success of the first edition; he has brought to bear a scientific grasp and thorough knowledge of the subject, and the result is the production of the standard work extant, which well deserves the warm and unanimous praise bestowed upon it by the educational and architectural press alike.

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## COMMENTS.

### Architectural Legislation and Qualification.

The result of the meeting of the Royal Institute of British Architects, referred to in anticipation in our last issue, resulted in the unanimous adoption of the proposals of the "Registration Committee" for a reconstruction of the Institute. We expected, having regard to the tenor of feeling at present prevailing amongst the members of that body, that such would be the case, but we were hardly prepared for the acclamation with which the proposals were hailed. These were outlined in our last issue and speak for themselves, and we were not a little surprised to note the readiness with which "the prestige of seventy years," as our contemporary "The Builder" calls it, was thrown away in favour of the new-fangled title. Doubtless, however, the members resident in London know well what is for their own best interests. We shall now be curious to note the attitude of the Society of Architects and the allied societies in the English provinces. The Irish Institute has already protested. The net result up to the present is, that registration, properly so called, stands exactly where it did before the appointment of the committee, the present proposed measure not being calculated to advance the objects sought to be gained through the general adoption of that principle. The imprimatur of the British Institute would in an Irish provincial town be in itself valueless, while, on the other hand, the proposition that the municipalities should retain as architects none save members of the British Institute is not practicable, and would, if the Bill applied to Ireland, be resented by the municipalities over here. To our mind the committee have but trifled with the issue. In addition, the determination of the Committee to steer a middle course has immensely strengthened the hands of the opponents of both registration and examination. In the current num-



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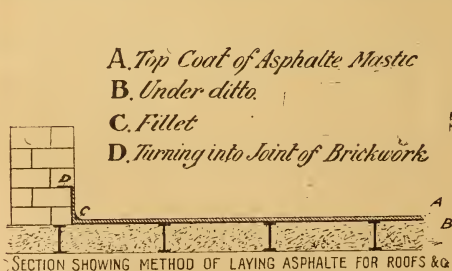
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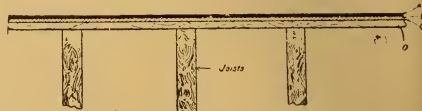
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ber of the Institute Journal appears a weighty letter from Mr. W. D. Caroe, in which he, while rejoicing at the way which has been found out of the difficulty by means of "a middle path along which the most divergent opponents are able to walk arm in arm," declares his strengthened and growing conviction against the fetish of examination, and deplors the policy which exalts it above and beyond all other qualifications. "There was never a greater fallacy," he says; and adds, "the advocates of such a test are blind to what true education means," and that "the architectural profession in assuming that test as a cloak, tightly bound about, is falling behind the times. The diploma throws dust in the eyes of the public, gives a spurious hall mark to mediocrity and even incompetence, and in fact defeats itself irrevocably. A compulsory examination can have none too high a standard, and does not serve to weed out. The outcome is precisely the contrary. It serves to tempt in, in large numbers, those who, if an examination did not exist, would never have dreamt of entering the profession at all, have no real call to it, and only do so because the existence of the diploma suggests a means of livelihood." Mr. Caroe further points out that the inevitable result has been "a great increase of competition by crammed incompetence, and a lowering of the standard." Mr. Caroe puts his case strongly, very strongly, and it cannot be denied there is inexorable logic and much truth in his arguments. They are the views of many of the best men in the profession, and were we living in an ideal atmosphere of pure taste, might be heartily commended, as the principle upon which to proceed towards the advancement of architecture; there is moreover force in what he says about the overstocked condition of the profession and the large element of incompetence that prevails even amongst those armed with the shield of the diploma—indeed, the time has fully come when an effort should be made to keep within limits the dangerously increasing numbers who daily enter the profession without any special aptitude for it and possessed in the main only of theoretical knowledge. It is a serious question. But, after all, despite what Mr. Caroe so ably argues, is it not a question of the choice of the lesser of two evils, which is better, the mediocrity, even the "crammed incompetence," or absolute quackery, fraudulent sham, and hopeless ignorance. That is what the humbler provincial architect has to face, and that is what the small building owner in the provinces, in Ireland at least, to a great extent not only avails himself of, but encourages.

#### Architectural Education in Ireland

We learn that the Committee of the Architectural Association of Ireland have decided to approach the Council of the Royal Institute of the Architects of Ireland with a view to ascertain whether and to what extent the senior body is willing to co-operate in a general scheme of architectural education for Ireland, and with that object in view a deputation has been appointed to wait upon the Council of the Institute to put forward the views of the Association, and to formulate certain proposals. In October last a sub-committee was appointed to inquire into and report upon what steps it was desirable and practicable to take to accomplish the object in view. In the course of a very able report, signed by the hon. secretary of the committee, it is set forth that they began by considering the system of the present working of the classes under the A.A.I., and the results obtained, and are of opinion that while the present method of class work is of considerable educational service and has already achieved much success, it has some grave disadvantages.

(1.) That no special system is adopted whereby the student may attend more advanced classes year by year.

(2.) That there is no ultimate tangible aim towards which the student may devote his studies.

(3.) Most important of all, there are no facilities by which the student may take up a course of studio work.

Further, that these disadvantages are apparent, is evinced by the lack of support given to the present classes by the pupils and assistants; that there is a feeling that the present curriculum does not meet with the modern requirements of an architectural education.

The sub-committee are, therefore, of opinion that an immediate change in the working of the classes is desirable, with a view to continuity of education, and for this reason a syllabus of work should be drawn up by a responsible body, and followed, as far as possible, by the lecturers.

In considering on what lines such a revision could best be conducted, consistent with the A.A.I.'s present educational and financial means, the sub-committee were immediately confronted with the total lack of any methods existing in this country by which the knowledge obtained by the student could be tested.

This deficiency was already perceived by the Association, after seven years' educational work, when the Royal Institute of Ireland was (sometime previously) approached with a view to holding an examination for admission to that body. It was hoped that by the adoption of such a course the architectural student would be more or less compelled to take up work outside office routine in order to become a member of the R.I.A.I., and by this means the educational work of the A.A. would be facilitated and a definite goal obtained. Owing to various causes, upon which it is unnecessary for us to comment, the Irish examination question fell through, and the only important examinations which remain as an inducement to and a test of study are those conducted by the Society of Architects and the R.I.B.A.

Having regard to these facts and the difficulty of maintaining an independent curriculum in Ireland, that the Royal Institute of British Architects' syllabus was drafted by experienced architects, in accordance with known requirements; that admission to R.I.B.A. after 1906 can only be obtained by examination, the sub-committee have come to the conclusion that the Association should avail themselves to a great extent of the syllabus that lies to their hand, revising it where necessary to bring it into accord with the requirements of the Irish student.

The sub-committee then go on to detail a curriculum suited to Irish needs and ways and means, but which it is not necessary to here describe in detail, pending public formulation of these proposals, and which comprise particulars of a methodical course in architectural history, building construction, drawing and design, etc.

It is also pointed out that the instruction obtained in technical schools, being too specialised, is scarcely suited to the requirements of an architectural student. It is most undesirable to await developments in other educational centres, that if the Association inaugurate a scheme of its own, it will be in a stronger position to negotiate with extraneous bodies, even if it becomes desirable or necessary to do so.

The report adds that "when the amount of training an architect can and generally does avail himself of in other countries is considered, it is a matter of serious moment to the profession in Ireland that some immediate steps should be taken to afford our students equal facilities."

In conclusion, mention is made of what we believe has hitherto been a great deterrent to Irish students from preparing for the professional examinations of the British Institute, namely—the preparatory condition of passing a preliminary examination in elementary general education. This examination is of so comparatively simple a nature that any boy fresh from a good school should be able to easily pass it without any special training. Nevertheless, when we consider the very defective methods of so many Irish schools, and the too widespread superficial and purposeless character of much of the instruction imparted, we cannot wonder at this examination proving a stumbling block. A fairly good general education is really the first essential of professional education, and one the lack of which no amount of purely technical knowledge can ever com-



pensate for or supply the deficiency. Every Irish architect in practice who has had pupils knows the educational deficiency that exists in nine apprentices out of ten. Without this general education it is hopeless to look for either true refinement in design, culture in the sense of a desire to achieve worthy work apart from purely utilitarian, or even the soundly scientific and intelligent use of materials. The preliminary examination of the British Institute represents the minimum of what is essential to these ends.

The sub-committee, realising this, end their report by saying that they are "of opinion, from expressions obtained from the younger pupils and assistants, that classes in Physics, Mathematics, and French would meet with earnest support from those who wish to pass the preliminary examination of the R.I.B.A., subjects which often act as a great deterrent."

The chief way in which the Irish Institute can help, failing the institution of an independent examination, is by making it more difficult for young men to enter the Institute without first undergoing a proper systematised training, and by encouraging and helping the Association in the difficult task before it. The Institute might also do much by passing a resolution binding its members to make it a condition of pupillage that every apprentice bound to a member should pass a preliminary examination in general education within 12 months of signing his articles, and that his articles of indenture should not be handed to him, nor should he be eligible for membership of the Institute, until he had at least passed the intermediate examination of the British Institute or an examination equal thereto.

#### "ARCHITECTURAL SKETCHING AND DRAWING IN PERSPECTIVE."

Some time since "R's Method of Perspective" was brought under the notice of architects and draftsmen, and attracted a considerable amount of attention. This method consisted of a system of diagrams whereby any person could draw in perspective before he understood the theory. R's method gained a considerable degree of appreciation, and its author now, under his own name, has written a volume, published by Mr. Batsford, and containing 36 plates, which amplifies in every way the outline of "R's Method."

Now the advantages of being able to draw in perspective correctly, and with some degree of artistic skill, are self-evident. No architect who has not at least a working, even rule-o'-thumb, acquaintance with that art, will ever design satisfactory buildings, for to tell how a structure will look when executed one must first see it existent in the mind's eye. With most men, to do this involves sketching it in perspective. So much for the artistic aspect. As to the practical, the advantage of being able to give a befogged client, who does not know his own mind, hasn't realised what he wants, and is only puzzled by a working drawing, a little perspective sketch is simply invaluable. Such a sketch, with a plan, conveys more to a man such as we indicate than a ream of the most elaborately-drawn and coloured geometrical drawings. That means business, and it means the saving of much valuable time, which is wasted in preparing tentative or perfectly abortive schemes. Now, we have men who are skilled perspective artists in the best sense, such as Raffles Davison, McGibbon, Langham, G. E. Mallows, Herbert Railton, and others. We have men who have a moderate working knowledge of perspective in theory and practice; other men who simply sketch by the eye; but outside these we have a great body of architects and draftsmen to whom perspective drawing has always been a bugbear, who consequently do without it, and so deprive themselves of that wonderful, artistic and practical aid. Practical it is, for in sketching a design in perspective, little difficulties of construction, little objectionable features and jarring notes become apparent that would otherwise have been realised only too late, when the building was completed. It must be confessed that the art as ordinarily taught is well calculated to scare the indolent student who cannot assimilate the rules, or regards the result as not worth the labour. Now, Mr. Roberts professes to have simplified matters for such people. If he has, he has done a great work. What we have to ascertain is, to what extent, if

any, are Mr. Roberts' methods simpler than the ordinary system. In his prospectus Mr. Roberts tells us that—

"The principal reason for issuing the present book is to provide a progressive course of perspective drawing, founded to some extent upon the Method ('R's Method'), showing its application to various problems of practical work. The intention, therefore, is not to add another to the already long list of those on theoretical perspective; its aim is rather to present perspective in a simple form, and to aid the draughtsman by placing at his disposal various practical expedients to simplify the details of his work. One of the diagrams in the 'Method', over which the majority of the plates have been drawn, is included among the plates, perforated, so that the learner can take it out, place it under any plate, and trace the methods by which the drawings are set out."

Unquestionably the work is a most ingenious one, and is quite plainly the result of close study of the question. The author begins with very simple problems, he shows the principle of perspective, and the "diagonal vanishing point." Briefly put, Mr. Roberts claims that by his system it is possible to rapidly and accurately sketch all kinds of involved work. This result is attained by the aid of a series of diagrams, based on the knowledge that the building is placed at a known angle in relation to the point of sight, and that it is consequently possible to construct such a diagram of vanishing lines, combined with vertical lines, as will give the perspective value of any two, or of any series of parallel lines, and incidentally of curved surfaces, too. The book contains 36 plates, with over 200 figures, all drawn on transparent paper, so that the diagrams may be placed under them, and Mr. Roberts' demonstration of the working method.

In the latter portion of the book these principles are applied to the delineation of actual objects, and hints are given on sketching figures and foliage. To those who are already acquainted with the author's "method," this book will be of great use as showing its full and wide application; while to all students unacquainted with the "method," it will be found a course of perspective drawing both easy and effective, although very simple, and it cannot fail to be of the greatest value to all.

The plates indicate many valuable methods or hints on perspective drawing; for instance, Mr. Roberts shows that by the aid of his diagrams one may easily get the "overhang" of projection of features by means of diagonals through squares, lines may be drawn at any angle by the use of a large square, and the way of setting out given angles is given.

In the space of such a notice as this it is not possible to fully describe Mr. Roberts' methods; for that we must refer our readers to the work itself, simply noting for their information that it has a considerable degree of simplicity to commend it.

In the course of his observations, Mr. Roberts makes some interesting notes. He has travelled far in introducing his method to architects, and has met with truly curious experiences. He tells us, incredible as it may seem, that he found the practice of perspective drawing in but few offices! One architect told him, "A perspective has not been made in this office for forty years;" another, "We have no time to make them;" a third, "They are always 'faked';" again, "Perspectives are too much bother;" while more sensible and up-to-date men told him, "I always rely on my perspective. I make a perspective of every building I do." He met only a score of men who realised the fact that till the project was well thrashed out, all that it is necessary to submit to a client is a plan accompanied by a sketch. In some observations entitled, "On the art side of it," he remarks upon the value of simplicity, that a life of study conduces to the love of it, and is a corrective to that love of elaboration that breaks out in serious epidemic form and spreads far and wide. Truly, as he declares, if only half the cornices, string courses, window dressings, and other so-called enrichments, and three-quarters of the carving and pot ornaments were removed, how much better our street architecture would be? They harbour dirt, cut up and belittle the effect, and are really only such vulgar ostentation that the author would like to see them taxed. Is not all this manifestly true, and would not a knowledge of perspective help the designers to see much of it as it really is? Mr. Roberts has written a good, simple work on perspective—to what extent his method deserves to supersede the old system, it would be premature for us to dogmatically declare—that is a point that can only be solved by the perspective draftsman of skill who gives the method a full and lengthy trial. Frankly, we are personally not quite convinced, but then, we have had no opportunity of putting the method to exhaustive trial; but it seems to us that at all events, for a certain class of work it should prove most valuable. It is evident that a knowledge of perspective is simply invaluable, and Mr. Roberts' work seems to conduce thereto. Therefore, it is well worthy the study of all who either understand and practice the art of perspective drawing, or ambition a facility in it.

"Architectural Sketching and Drawing in Perspective," with thirty-six plates, illustrating the drawing of architectural details and sketching to scale, including chapters on the plan and measuring point methods, the simplification of perspective by R's Method, and on figures, foliage, etc. By H. W. ROBERTS, Architect, author of "R's Method of Perspective." London: B. T. Batsford, 94 High Holborn, 1906.

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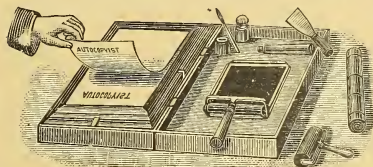
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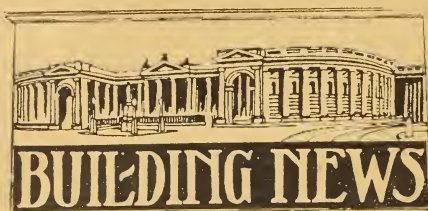
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**Armagh.**—**ARTISANS' DWELLINGS IN ARMAGH.**—An inquiry was held in the Courthouse, Armagh, before Mr. P. C. Cowan, Chief Engineering Inspector of the L.G.B. The inquiry was held on the petition of the Urban Council, who made application for a sanction of a loan of £15,000 for the erection of artisans' dwellings under the Housing of the Working Classes' Act. The sum of £9,000 was asked for the carrying out of an improvement scheme, by which it was suggested to demolish about forty-six houses unfit for human habitation, and on the same site erect about sixty houses. The remainder of the £15,000 was for the proposed erection of forty-eight artisans' houses.

**Ballinoe.**—Rev. John Murphy, P.P., Conna, has received tenders for the raking out and cementing of the walls of the teacher's residence at Ballinoe.

**Buncrana.**—Tenders are invited for the following works:—  
No. 1.—The erection of a school teacher's residence, according to plans and specifications supplied by the Board of Works. No. 2.—The carrying out of certain alterations to the Parochial Hall at Bansa, according to plans and specifications prepared by Mr. F. Bergin, B.E., of 36 Westmoreland-street, Dublin.

**Borrisokane.**—£5,000 has been left by the will of the late Miss Clarke, of Macclesfield, to erect a hall in Borrisokane to the memory of her father, who owned large property in the district. The shamrock, the rose, and the thistle are to be displayed on a flag to be placed in the corner, with the inscription:—"Let not religion, the sacred name of religion, which even in the face of an enemy discovers a brother, be no longer a wall of separation to keep Irishmen asunder."

**Belfast.**—Mr. Francis Quinn, of the firm of Messrs. Francis Quinn and Son, contractors, Bloomfield, Belfast, has been appointed building expert to the Home Office for Belfast and North of Ireland in succession to the late Mr. William Gabbey. Mr. Quinn has acted as arbitrator and expert witness in a large number of cases.

**Cork.**—Tenders are invited for building and completing a gentleman's residence on the College road, in accordance with plans and specification prepared by Messrs. W. H. Hill and Son, Architects, 28 South Mall, Cork.

**County Cork.**—Tenders were received by Miss O'Donoghue, Farnanes, Co. Cork, for the erection of a residence, according to the plans and specification prepared by Mr. A. W. Barnard, M.Inst.C.E.I.

**Dundalk.**—Tenders have been received for the erection of a residence on the Forkhill-road, Dundalk, for Mrs. Johnston. Mr. W. S. Barber, architect, Francis-street, Dundalk.

**Dublin.**—On the question of the supply of cement to the Corporation, which arose on a report from the Supply Committee, it was agreed that the tender of Mr. Edward Tickle for Wexford cement at £1 15s. was recommended, and that of Mr. W. F. Chadwick, for Belgium cement at £1 3s. 6d. A proposal to accept nothing but Wexford cement, proposed by Alderman Kelly, seconded by Mr. O'Kelly, was withdrawn after some discussion. It would be interesting to know whether the Corporation have strengthened themselves by any expert opinions and tests as to the relative merits of Irish and Belgian cements. Some imported cements are of very inferior and unequal quality.

**Donaghadee.**—The Local Government Board have written to the Urban Council approving of the appointment of Mr. Thomas Pentland, C.E., as town surveyor.

**Glencullen (Co. Dublin).**—A new R. C. Church is to be built here. The Rev. J. Kelly, of Sandyford, is the Parish Priest. We understand an architectural competition will take place for the design.

**Kells.**—**ARCHITECT RESIGNS.**—Mr. James O'Donnell, Roseville, Carlow, wrote to the Urban Council on the 31st ult. stating that he would be unable to give any attention to the Town Hall project for a considerable time, and he would offer no objection if the Council made other arrange-

ments to have the arrangements carried out. It was decided to take the letter from Mr. O'Donnell as a resignation, and the Council ordered that the clerk advertise for an architect. The Council, provided the Local Government Board approve of the application for loans, propose building a new Town Hall and 12 artisans' dwellings. The Council have on hands the plans, etc., of the 12 houses.

**Lisburn.**—The Lisburn Rural District Council invite applications from competent persons for the position of consulting engineer in connection with Dunmurry sewerage scheme. Applicants to state terms (a) for examination of district and report on scheme, (b) per day for any additional work that may be required.

**Moir.**—The Rural District Council require the services of an architect in connection with a scheme of 50 labourers' cottages, and invite applications from duly qualified persons. Applicants are to state the terms for which they will act under the following circumstances:—(1) in the event of a clerk of works being appointed by the Council; (2) in the event of the Council deciding not to appoint a clerk of works. Applications will be received by me up to the 19th inst.

**Navan.**—There is reason to believe that the Local Government Board will grant a loan to the Navan Urban Council for the building of additional labourers' and artisans' dwellings in the town.

A short time ago the Council applied for a loan of £2,400 for the erection of 17 houses. An inquiry having been held, the L.G.B. refused to sanction the loan owing to the defective state of the drainage system of the town as disclosed in a report made by Dr. Ryan, Medical Officer of Health. The Council have since remedied the defects to a considerable extent, the sewers in Academy street, which were the chief subject of complaint, being remodelled and improved at a cost of £240. Having thus set their house in order the Council determined to again approach the Custom House Authorities, and appointed Messrs. John Spicer (Chairman), James Maguire, and Simon Murray as a deputation for that purpose. On Friday Messrs. Spicer, Maguire, and Latter (Town Clerk), accompanied by Mr. White, had an interview with Sir Henry Robinson, Vice-President of the Local Government Board. The case for the Council was presented by the Town Clerk. Sir Henry Robinson having heard the views of the deputation, admitted that they had made out a good case, and promised to use his influence in favour of the application.

It is proposed to erect the new dwellings at the entrance to the town, on the Kells road, opposite to the fine range of twenty houses already built there by the Council.

**Skerries.**—A new golf club has been started at Skerries. The pavilion has been erected from the designs of Mr. J. H. Pentland, R.H.A.

**Tuam.**—The Tuam Town Commissioners will receive, on 1st May next, tenders for contract to repair the roof of the Town Hall, the stonework of the Clock Tower, and the ceiling of the clerk's office.

Some members of the Society of Architects resident in Ireland have forwarded to the Council of the Society a memorandum protesting against the character of the recent proposals of the Royal Institute of British Architects to promote a Bill in Parliament to give State recognition to the members of the Institute. The signatories allege this recognition is proposed to be gained at the expense of those outside the Institute.

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# ENGINEERING SECTION.

## ITEMS.

It is little wonder that architects and engineers find there is but little work for them to do, when there are individuals who will design structures from entirely philanthropic motives. In our last number we published an unusual letter as to the design of dwellings for the poorer classes, which formed but one of a number which have been recently addressed by a firm of *Electrical* engineers to various local bodies. The latest information to hand is that the new public lavatory for the Kingstown Urban Council has been designed by one of the members of the Council, and the plans prepared free of cost. There is, unfortunately, no means to hand by which either engineers or architects can effectually arrest the all-embracing tendency of their respective professions, and of course no registration proposals, however drastic, can hinder the results of such pure unselfishness as the incident above records. We merely draw our readers' attention to it as a sign of the times.

Possibly the greatest trouble which an engineer has to face, and one that calls for the immediate exercise of his best constructional and reasoning powers, is when a large and costly structure in his care shows sign of failure and of a possible catastrophe occurring to the public. It is at such a moment that he is liable to become panic stricken and fearful lest any contributory negligence should involve him in the direst trouble, and more particularly cast upon him the awful responsibility of the loss of human life. It is then difficult to define how little should be done in the way of safeguard, and it often occurs that serious work is undertaken which on cooler consideration would have been seen to be unnecessary. The paper read by Mr. Frank Latham before the Society of Engineers on April 2nd, 1906, entitled "Harbour Exigency Works," was for the above reason of immense utility to those who had the good fortune to be present. Several serious occurrences were observed at Penzance Harbour, caused by the heavy swing bridge, the weight of which, when open, had caused the foundation to subside, the retaining walls to be thrust outward, and the whole structure to have a general tendency to sit down. The masonry to the harbour wall became seriously damaged, and the dock gates, each of which weighed over 50 tons, revealed structural defects. Mr. Latham dealt in detail with the methods by which he applied "first aid" and the subsequent schemes by which he was enabled to effect the necessary repairs without interrupting the traffic. His description was a mine of information to his audience, and there is little doubt that the results of his experiences will be of service to many of his hearers in the future.

The last paper of the present session of the Institution of Civil Engineers, Ireland, was read before that body on April 4th by Mr. M. T. Ormsby (member), the subject being "Buttressed Masonry Dams." The lecturer came over from London especially to read his paper, and, as he stated in his concluding remarks, the economics which would be effected by the use of buttressed dams in lieu of the usual solid masonry dams would not apply perhaps so much in Ireland as elsewhere. With the latter form of dam, if less than forty feet in height, the pressure set up is much less than either the masonry or a rock foundation can be relied on to safely withstand; consequently a considerable saving of masonry can be effected by building the walls much thinner, forming buttresses to guard against the tendency to overturn. In dams of this class the batter is not confined to the water face of the dam, but is also provided on the inner face, the main continuous wall being much nearer a rectangle in section than is the case with solid dams. The paper had not, as is usually the rule with this Institution, been printed and circulated prior to the meeting, and the author confined himself chiefly to a description of the mathematical and theoretical calculations by which he had arrived at certain data from which the structures he advocated should be designed. These were fully illustrated by stress and curve diagrams, and the conclusion he arrived at was that, *ceteris paribus*, the saving of masonry in buttressed dams, as compared with solid trapezoidal dams, was from 40 to 28 per cent., the vertical pressure on the base being proved to be about 5 tons per square foot with heights up to 40 feet. Beyond 40 feet the conditions were such that little economy would be effected between the two forms. Mr. Lilley proposed a vote of thanks to the lecturer, and congratulated him on his careful mathematical analysis and the clearness of the diagrams, but stated he did not feel confi-

dent that the small scale dams upon which Mr. Ormsby had proved the application of his theories were of sufficient value to make it absolutely certain that a full size structure would give similar results. Mr. Moore, the County Surveyor for Meath, in seconding, considered that the saving of material, especially if it were concrete, would be outweighed by the extra cost and time lost in the necessary casing for a wall sloped on two faces, supported by buttresses which, in a dam 40 feet high, would, as the author showed, have to be spaced two feet apart. In this criticism many of the engineers present would doubtless be inclined to agree. But, in spite of the fact that cordial agreement could not be expressed with all Mr. Ormsby's opinions and deductions, his remarks indicated the careful study and original research which are such happy features of the papers read before the Institution.

Prior to the reading of the paper the usual monthly dinner was held at the Shelbourne Hotel, and by reason of its informality and camaraderie was as thoroughly enjoyable as these gatherings are. They form a feature of the proceedings of the Institution of Civil Engineers of Ireland, which have continued for over a quarter of a century, and it is one which might be followed by other professional bodies in Dublin with advantage to the societies themselves and to their members.

Messrs. Boyle, the well-known ventilating engineers, have recently issued a pamphlet calling the attention of school managers to the necessity for the proper and thorough ventilation of the buildings in their charge. This firm has devoted much time and energy to the ventilation problem, and while the circular has been issued for business purposes it nevertheless contains much information of value to those who have the care of the education of the young. The managers are reminded that the best form of inlet ventilation is by means of brackets or tubes fixed round the walls at suitable intervals, the admission of fresh air being regulated by valves. It is also pointed out that when the air is admitted through windows it should enter through protected openings at the lower parts, and be deflected upwards. Hot air should never be used for the combined purposes of heating and ventilation, as most authorities are unanimous in condemning heating by hot air as injurious to health, there being always a serious liability of the method of its preliminary treatment becoming defective. It is often thought that by providing a sufficiency of window opening every precaution has been taken, the fact being entirely overlooked that owing to atmospheric influences it often becomes undesirable to open the windows while the school is occupied. It is, therefore, essential that some other form of inlet and outlet ventilation should be afforded, and it is worthy of note that Messrs. Boyle's suggestions fit in with the methods incorporated in the model plans for Irish National Schools which are issued to the managers, who may require them for building purposes, by the Office of Public Works.

The recent published report of Sir Alexander Binnie on the Bann and Lough Neagh drainage schemes has been considered by some to be the finding of the Arterial Drainage Commission. The two matters are, however, entirely distinct, as the latter body is still sitting. It will be recollected that some years ago Mr. Dick, the engineer of the Board of Works, had the question of the flooded areas under consideration, and estimated the cost of the necessary works at £150,000, of which sum the Government of the day offered to contribute £50,000 out of the Development Grant. The balance was considered too large to be met by local contribution, and the estimate was also thought to be excessive; the scheme, therefore, fell through, although the exigencies of the case have never for one moment been lost sight of. After much Parliamentary discussion an absolutely independent opinion was sought, and Sir Alexander Binnie was asked to report and give an estimate, which amounted to £76,000. This sum is but little over one-half the former estimate, but while Mr. Dick's scheme provided for the retention of the navigation, the latest proposals do not take this factor into consideration. Whether the abolition of the navigation would be a wise step is open to argument, although it is not of much present moment, the tolls having dropped, as we are informed, to £42 per annum, while the maintenance costs about £1,000 per annum, which sum is met by a rate levied by the County Councils of Armagh, Antrim, Londonderry, Down, and Tyrone, through



a managing body known as the Navigation Trustees. This proportionate rate was fixed by the Board of Works in 1860. The abandonment of navigation would, however, first have to meet with the general consent of the bodies locally interested, and a Bill would have to be promoted in Parliament to sanction the step, and it is possible that before such proceedings could be inaugurated the Canal Commission will deal with the subject in the course of its inquiry. It seems undesirable, at the present stage, to still further curtail portion of the navigable waterways of Ireland, and lessen even to a small extent competition with the railways. A point which will receive weighty consideration from another local body, viz., the Drainage Trustees, who are elected by the proprietors of benefited lands who contribute to the drainage maintenance fund, is whether if the navigation charges be removed from the counties the drainage charges would not be materially increased. It will thus be seen that while Sir Alexander Binnie's report deals with the engineering difficulties, such only from an element of the whole question, and the subjects of meeting first cost, area of maintenance charges, and the constitution of a responsible governing body yet remain to be threshed out. It is quite possible that the Arterial Drainage Commission will deal with them.

Lieut.-Col. Winn, R.E., A.M.I.C.E., one of the contributors to the first number of the paper devoted to concrete and constructional engineering, puts forward a suggestion that, in the years to come, our descendants will describe the twentieth century as the advent of the "Concrete Age," and that as such it will rank with the "Stone Age," the "Bronze Age," and the "Iron Age" of years gone by, and the "Steel Age" of the last century. He points out the economy of material which has been effected by the introduction of reinforced concrete, walls 60ft. in height having been erected, with a thickness of but 4 inches between the main piers. Chimney stacks 141ft. in height have been constructed, the outer shell of which was only 6 inches thick at ground level, diminished to 5 inches at the top; of bridges up to 167 feet span, and sewers 6 feet in diameter, all readily and efficiently formed of ferro-concrete. The reason why this joint use of steel and concrete is superior to the former methods of combination is obvious. The steel in the body of the mass supplies the tensional resistance which concrete lacked, the liability of the latter material to sudden fracture was ever a disability to its employment, and this tendency is now overcome. Moreover, the concrete is assumed to effectually protect the encased steel from the deleterious influences of climate. We do not think that at this stage the latter assumption is proved beyond doubt, for sufficient time has scarcely elapsed to enable reliable data to be obtained. From past knowledge it would rather appear that there is a danger of damp attacking the steel, especially if it has rusted at any points prior to its insertion. Possibly careful execution would obviate this, but at present it is not desirable to run risks for the sake of achieving engineering conjuring feats.

### THE RESISTANCE OF IRON AND STEEL TO REVERSALS OF DIRECT STRESS.

By Messrs. T. E. Stanton, D.Sc., M.Inst.C.E., and L. Baird, A.R.C.S.

At a meeting of the Institution of Civil Engineers, London, on 10th April, Sir Alexander R. Binnie, President, in the chair, a paper was read "On the Resistance of Iron and Steel to Reversals of Direct Stress," by T. E. Stanton, D.Sc., M.Inst.C.E., and L. Baird, A.R.C.S. The following is an abstract of the paper:—

While recognising the valuable work which has been done by previous observers in the study of the fatigue of metals the authors called attention to the fact that further experimental work on the subject is much needed, for the following reasons:—

- 1.—Practically all the previous work, with the exception of Reynolds and Smith's experiments, has been done by subjecting the materials to transverse stresses, the intensity of which has, therefore, to be calculated by the ordinary theory of bending.
- 2.—The resistance of the materials in common use by engineers at the present day when subject to reversals of stress is imperfectly known, and there exists considerable difference of opinion as to the materials best suited for stresses of this kind.
- 3.—Although it appears from Reynolds and Smith's experiments that the resistance of iron and steel is seriously diminished when the alternations are very rapid (*i.e.*, 1,500 to 2,000 per minute), it is not

known if this reduction in resistance is considerable at those speeds which are common in high-speed reciprocating motors (*i.e.* in the neighbourhood of 800 reversals per minute), since the majority of experiments have been made at approximately 60 reversals per minute.

- 4.—Although it is generally recognised that the effect of moderately rapid or sudden changes in section of materials subject to reversals of stress is to diminish their resistance, the amount of this reduction in strength for the various materials commonly used is not known.
- 5.—The common assumption that, in cases in which the stress varies from tension to compression, but between unequal limits, the resistance depends solely on the range of stress and not on the actual values of these limits, has not been experimentally verified.

From these considerations it was decided to undertake a research, the object of which should be the experimental determination of the resistance of certain kinds of iron and steel, under the special conditions mentioned in the above paragraphs, when subject to reversals of direct stress.

The experiments were made on the alternating stress testing machine which has been designed and constructed at the National Physical Laboratory, and which has been fully described in *Engineering* (17th February, 1905).

Jointly with this work, a microscopical investigation has been made of the changes which take place in the crystalline structure of materials under reversals of stress as the test proceeds, to determine if possible the manner in which ultimate failure occurs.

The materials upon which the tests have been made may be conveniently divided into three groups:—

- 1.—Three samples of Swedish Bessemer steel and one sample of Swedish charcoal iron presented by Mr. R. A. Hadfield for the purpose. The carbon content of the steels was approximately 0.17, 0.44, and 0.64 per cent.
- 2.—Four samples of steel presented by Messrs. Belliss and Morcom for the purpose. Of these, two were mild-steel bars, one was a bar of harder steel used for piston-rods, and the fourth consisted of specimens which had been cut from a large steel forging.
- 3.—Two samples of wrought iron of British manufacture, bought for the purpose of the tests.

Although more uniformity in the results of the tests would no doubt have been obtained by subjecting all the specimens cut from any given material to an annealing process, it was felt that this would detract from the value of the tests owing to the well-known effect of heat treatment on the resistance of steel. For this reason the tests were made on the bars as received; and in cases in which there were several bars of the same material, the specimens in any group of tests were not always cut from the same bar. This does not apply to the case of specimens whose structure was examined microscopically, in which the actual resistance was of secondary importance.

The results of the experiments may be stated briefly as follows:—

- 1.—The superiority, in resistance to reversals of stress, of moderately high-carbon steels over low-carbon steels and wrought irons, which was discovered by Wohler to exist when the rate of reversals was 60 per minute, still holds when this rate is increased to 800 per minute, although according to Reynolds and Smith's experiments this superiority no longer exists when the rate of reversals is in the neighbourhood of 2,000 per minute.
- 2.—As far as comparisons can be made between the results of the present experiments and those of Wohler and Sir Benjamin Baker, there is no marked reduction in resistance due to raising the rate of reversals to 800 per minute.
- 3.—Experiments in which the ratio of tension to compression varied from 1.4 to 0.72 indicated that between these limits the value of the maximum range of stress was practically independent of the actual values of the limiting stresses in tension and compression.
- 4.—The resistance of the materials in three typical cases of rapid reduction of area of the specimens has been determined.
- 5.—The failure of iron specimens due to the development of the slip-lines of Ewing and Rosenhain into cracks has been determined for the case of direct stress; and the failure of moderately high-carbon steel, due to the development of cracks in the ferritic areas of the structure, has also been established.

## SEWAGE DISPOSAL AT MAESTEG.

When the septic tank system was first introduced at Exeter some of the earliest visitors were a deputation from the Urban District Council of Maesteg, and they were so impressed with what they saw that, after giving the matter full consideration, they decided they could not do better than adopt the system for their own district. This led to negotiations, which resulted in an agreement being entered into as long ago as the beginning of 1898 between the Urban District Council and the Septic Tank Company, Ltd., for the supply of their fittings and apparatus for the proposed installation, and the furnishing of the necessary particulars to their engineer, Mr. Humphreys.

The necessary plans were prepared, and the complete scheme submitted by that gentleman on behalf of the Council to the Local Government Board, and approved in the year 1901. The scheme was duly proceeded with, and just before Christmas was completed and the sewage turned in.

Meanwhile the town has been rapidly increasing in population, and now this comes within measureable distance of the number provided for, viz.—11,000.

The installation consists of four septic tanks and twelve aerating bacterial filters, with storm overflow, grit chambers, cleansing wells, etc., complete. The main outfall sewer discharges through the overflow chamber into the grit chamber, from which two feeding channels convey the sewage to the septic tanks, and these all discharge into an effluent channel, from whence the main effluent carrier conveys the liquid to the filters.

The filters are arranged in separate groups of four, each group being controlled by the Septic Tank Company's well-known central basin gear for filling and discharging the

to be started. The system here will comprise liquifaction in tanks, treatment on filters, and, finally, irrigation over land.

We hope at a later date to publish some views of the works at Greystones, Delgany, and Enniskerry.

## THE HARBOURS OF SOUTH AFRICA.

BY MR. C. W. METHVEN, M.Inst.C.E.

At the ordinary meeting of the Institute of Civil Engineers on 3rd April, Sir Alexander R. Binnie, President, in the chair, the paper read was "The Harbours of South Africa; with special reference to the Causes and Treatment of Sand-Bars," by C. W. Methven, M.Inst.C.E. The following is an abstract of the paper:—

The paper began with a short description of the littoral of South Africa from Capetown to Delagoa Bay. The author pointed out the remarkable absence of deep water indentations forming natural harbours between these points, and gave some reasons for this. Reference was also made to the formation of some of the lakes and lagoons, and the gradual elevation of the coast-belt as effecting the present physical condition of the coast.

A brief description of Table Bay Harbour was given, and the works of dock-extension proposed by the author and Mr. Hammersley Heenan, general manager and engineer to the Cape Harbour Board, estimated to cost £3,501,757, were referred to. Statistics were also given showing the increase in customs revenue, imports and exports.

The embayments on the south-east littoral as far as Algoa Bay were next dealt with, with brief references as to their suitability for the construction of harbours. The author described the main features of Algoa Bay and the



Sewage Disposal at Maesteg.

beds. The cycle given by this gear is precisely the same as that of the original installation at Belle Isle, Exeter, which has given such excellent results for the past ten years.

Approximately the cycle is as follows.—The filter when it is full will discharge the filter previously filled, and starts the next one in rotation filling.

The results obtained are highly satisfactory to all concerned, although the dry weather flow is considerably in excess of that which was expected when the works were designed. The filtrate is clear and bright, and is not subject to after decomposition.

The attention required to the installation can all be given by one man.

The Council and their Engineer, Mr. Humphreys, are to be congratulated upon the way in which the works are carried out by Mr. Henry Hill, the contractor, and another installation is added to the long list of successes with which the Septic Tank Company's name has been associated.

The Septic Tank Company have several installations on similar lines successfully working in this country. Amongst them may be mentioned Tipperary, Delgany, Co. Wicklow. At Greystones, where the works are at present in progress, the ramification will consist simply of the breaking up and liquifaction of the solids, with a dilute sewage. The resultant effluent is of a very satisfactory character, and while occasionally turbid or odorous, is yet wholly free of any floating solids or residue of any kind. The effluent is then discharged well below low water mark into the sea at a point where there is almost constant movement, due to eddies and currents. The result, it is anticipated, will be that the tank effluent, being wholly liquid, will be dissipated almost as fast as discharged. The Septic Tank Company's system has also been adopted for Enniskerry, Co. Wicklow, about

remarkable strides which have been made in its commercial prosperity, in spite of the landing difficulties due to its exposed position and the want of adequate sheltering works.

A short description of the existing jetties was given, and reference was made to the two important schemes now under consideration: one to project two great breakwaters into the bay in front of the town of Port Elizabeth, so as to form an enclosed harbour of some 800 acres; and the other to open up the Zwartkops River, which runs into Algoa Bay, about 5½ miles to the northward.

The author next discussed the various causes to which may be attributed the formation of bars at the mouths of the rivers and lagoons on the south-east African coast, and the variations of their form, which take place in accordance with the physical features of the rivers and lagoons concerned, and of the coast-line in proximity to their outlets.

The treatment of lagoons was also discussed, with a description of their physical features and the causes of their formation, as well as of that of the sand spits separating them from the ocean. Illustrative reference was made to the lagoons at Durban, Umhlatuzi, and St. Lucia, in Natal and Zululand.

River harbours were next dealt with, including Port Alfred, East London, Port St. John, Durban, and Delagoa Bay.

After a short historical sketch of the engineering works carried out at Port Alfred, and their results, the author described the works proposed by him to reopen the river by the construction of a new outlet. In the description of East London Harbour special reference was made to the successful application of sand pump dredging to the bar in the open sea.

A full account was given of Durban and its lagoon, and



of some of the natural causes which have operated in its formation. Short statistics were given showing the increase in the port's commercial prosperity between 1846 and 1904. A detailed description was given of the original condition of the bar at the mouth of the lagoon, and of the changes which occurred in its form at different periods in the progress of the works. Special reference was made to the important operations of dredging on the bar in the open sea, and the results which have been attained.

#### REVIEWS OF CATALOGUES.

**Hair Bitumen.**—A small booklet dealing with this material, which is described as "an efficient and inexpensive underlining felt," will be found of interest by architects and builders. The principal uses to which hair bitumen can be advantageously applied are:—

- (1.) As an underlining for every form of roof covering.
- (2.) As a sound defenser (in place of pugging) under flooring, in which position it offers distinct advantages over many of the methods at present in vogue.
- (3.) As a sound defenser in partition work.

Sections showing the application of hair bitumen are given in the booklet, as well as the sizes in which the material is supplied and the prices. The manufacturers are Messrs. Engert and Rolfe, Ltd., of Poplar, London, E., from whom catalogues and full particulars can be obtained.

**Radiant Heat.**—This is the title of an illustrated pamphlet dealing with electric radiators, and published by the General Electric Co., Ltd., head office, 71 Queen Victoria street, London, E.C. Electric glow radiators are, needless to say, the latest form of scientific heat producers, and are distinct from other types of radiators, inasmuch as they give off a pure radiant heat, far purer than can be produced by any other method, their heat, in fact, almost resembling that of the sun. The heat produced by electricity is perfect in every possible sense, being absolutely free from the defects of gas, oil, etc. There are no dust, dirt, smoke, fumes, nor is the atmosphere dried or otherwise injuriously affected. Moreover, there is no possibility of a fire occurring with these radiators, as is the case with gas or oil stoves. In the catalogue in question a great number of radiators, both of the luminous and non-luminous type, are shown, most of them being highly ornamental, and suitable for almost all purposes where heat is required. It is impossible to imagine anything more convenient than an electric radiator in a bedroom or any other place where a temporary heat is required at a moment's notice. All that is necessary is to switch on the current, and instantly a warm glow is thrown out; no dirt, smell, or preparation whatever, nor is any fuel required. Those interested in the subject can obtain full particulars from the General Electric Co., Ltd., at their Irish offices, 16 St. Andrew street, Dublin, and 13, Queen street, Belfast. The company will also be pleased to give full information relative to their appliances for the adaptation of electricity to cooking and other heating purposes.

One of the finest catalogues we have seen for a long time is that issued by the **Carron Company**, of Carron Works, Stirlingshire (Dublin showrooms, 44 Grafton street), and dealing with their baths, lavatories, and sanitary appliances. The Carron Company enjoys a unique reputation for ironwork, and is of very old standing, having been incorporated by Royal charter in 1773. Their baths are quite equal to their other productions, being manufactured of the finest quality iron, specially selected for the purpose and tested by laboratory analysis, so as to prevent defects arising from the employment of inferior or unsuitable metal. They are also constructed on the most approved sanitary principles. All surfaces are perfectly smooth, and every part easily accessible for cleaning purposes. The highest quality "Carron" baths are porcelain enamelled, the most hygienic, comfortable, and attractive interior for baths, and the cheaper grades are metallic enamelled. The water are carefully decorated and finished by competent workmen in extensive ranges of tasteful colours in various styles of marbling and other inside and outside decorations. Some of these decorative effects are illustrated in colours in the catalogue, and, the reproductions being first-class, they may be left to speak for themselves. All the various types of baths are, in fact, excellently illustrated, full particulars as to sizes, prices, and extras being given. Pictures are also included showing interiors of modern bathrooms with "Carron" fittings. The arrangements are most artistic and sanitary, and quite ideal for the purposes of up-to-date bathrooms. An equally artistic range of lavatory stands, with and without ornamental and mirror backs, is shown, as well as designs of the various "Carron" bath fittings.

A further section of the catalogue is occupied with cast-iron wash-hand basins, kitchen sinks, and a variety of sanitary appliances. Having had ample experience of the quality and finish of "Carron" specialities, we have pleasure in drawing the attention of our readers to this catalogue, which can be obtained from either of the above-named addresses.

The Carron Co. have also sent us a copy of their new "Esto" and "Radiant" fire list. They are prepared to supply ironmongers with these lists printed with their name and address. The list should prove a very useful form of advertisement.

**Messrs. E. H. Shorland and Bros.**, Drake street Works, Stretford road, Manchester, send us a copy of their new supplementary catalogue, illustrating their latest designs of patent warm air ventilating Manchester grates, patent Manchester stoves, with open fires, and patent exhaust roof ventilators. The Manchester grates are shown in a variety of elegant patterns, and are all fitted with patent low fire projecting backs. A peculiarity of these grates is that they have no front bars, there being in consequence no obstruction to the radiation of the fire, and in addition they retain the well-known warm air ventilating qualities of the Manchester grates. New designs are also shown of warm air ventilating patent Manchester stoves, which are supplied either for ascending or descending smoke flues. These stoves are of exceedingly handsome design and have a cheerful appearance, owing to their being fitted with open fires. They also deliver large volumes of pure air, warmed to an agreeable temperature, and are, therefore, extensively used in hospitals, infirmaries, and other public buildings. Both the grates and stoves illustrated possess several unique features, such as their ventilating qualities, which strike us as being distinctly advantageous, and we have therefore no hesitation in recommending them to the notice of our readers, who can obtain full particulars from Messrs. Shorland at the above address. The catalogue also illustrates Shorland's patent exhaust roof ventilators built of rolled steel plates, and of Louvre and other ventilating grids.

**The Rotary Calculator (Halden's Patent).**—Messrs. J. Halden and Co., 8 Albert square, Manchester, send us some particulars of their patent "rotary calculator," an instrument likely to be of much value to engineers, architects and surveyors, who have to perform calculations rapidly and accurately. It is an instrument on the slide rule principle, but of watch shape, and suited for the waistcoat pocket, and which, it is claimed, equals, and is even capable of superseding, the slide rule in all its operations. It is a disc within a ring, together forming a dial, with logarithmic scales on both sides, and protected on each side by a glass disc with cursor line marked radially thereon, and capable of being revolved by the thumbs when it is required to set the line.

This calculator is neat and compact, being only  $\frac{1}{4}$  inch thick, while owing to its circular form the reading is always continuous; in addition to several other notable advantages it possesses those of great clearness, accuracy, portability, and cheapness. The price, complete in case, with full instructions, is only 12s. 6d. The uses of the slide rule and of the calculators based thereon are so manifold and constant that every engineer and architect should be versed in the use of these instruments, which are very labour-saving in their application.

#### ENGINEERING STANDARDS COMMITTEE.

The Secretary of State for India in Council has nominated Mr. A. Brereton, C.S.I., to represent the India Office on the Sectional Committee on Locomotives (chairman, Sir Douglas Fox), in the place of Sir Frederick K. Upcott, chairman of the Indian Railway Board. The Council of the Institution of Naval Architects have nominated Mr. Sydney W. Barnaby, of Messrs. John I. Thornycroft and Co., to represent that institution on the Sectional Committee on Screw Threads and Limit Gauges (chairman, Mr. H. F. Donaldson, Chief Superintendent of the Ordnance Factories), in the place of Mr. McFarlane Gray, resigned.

#### PHOTO-PRINTS BY ELECTRIC LIGHT.

Architects and Engineers who want good copies, quickly done, should send a post card to J. Lindsay, 17 Westland row, Dublin, or Telephone 2278. City orders called for. Prompt attention to country orders. Tracings neatly made. Photo-papers stocked.

## ENGINEERING NEWS.

**Athlone.**—The Urban District Council of Athlone invite tenders for the renewal of an oven of six retorts on the regenerative system. Tenders will be received on Wednesday, the 25th April.

**Newcastle (Co Down).**—PROPOSED SEWERAGE SCHEMES DISCUSSED.—At an adjourned meeting of the Urban Council the question of providing an efficient sewerage scheme for the town was fully discussed. The results of the recent interviews with Mr. J. F. Peddie, C.E., and Mr. J. H. H. Swiney, C.E., were submitted. Mr. Peddie proposed pumping and discharge of sewerage after treatment over filter beds into the Shimna River, at an estimated cost of £5,275, in addition to an annual cost of £200 for upkeep. Mr. Swiney's proposal was to convey the sewage by pumping clear of the town, and discharge at low water beyond the golf links, at an estimated cost of £6,500, in addition to an annual upkeep cost of £150. Dr. Bell said the objections to the existing arrangements were largely sentimental. The carrying out of an expensive sewerage scheme would be attended with disastrous results, as the ratepayers were not in a position to bear the heavy burden that would be entailed by the carrying out of either scheme. He pointed out how it would effect those who were dependent on invested capital, and, after recapitulating his views fully on the question, proposed that necessary improvements be effected to the existing system, and the postponement of the matter of providing an adequate system until the ratepayers were in a better financial condition. Mr. McCracken seconded. Mr. Young protested against shelving the question in such a manner, especially in view of expert opinion as to the necessity of the work. He strongly objected to spending the ratepayers' money in patching the present defective system. He would be inclined to undertake the scheme at once on the lines of discharging clear of the town and treatment, though the cost would be 1s. 1d. in the £ on the rates, in addition to 6d. in the £ for the cost of upkeep, rather than postpone the matter until a later date, and proposed an amendment to this effect. After several other members had expressed their views, the amendment was put and carried.

## IMPORTS.

## PORT OF DUBLIN.

April 4, per Alma, from Fredrickstad, 86,751 pieces floorings, 6,925 pieces scantlings, R. Martin and Co.; per Fruen, from Fredrickstad, 52,113 pieces floorings, 4,621 pieces scantlings, 200 poles, William Graham and Co.; Lady Roberts, from London, 880 sacks cement, J. P. Corry and Co.

April 6, per Inishowen Head, from Galveston and New Orleans, 3,257 pieces pine lumber, 241 hickory logs, 1,936 pieces oak lumber, to order.

April 9, per City of Hamburg, from Ghent, 12,547 bags cement, to order.

April 10, per Elidir, from Newcastle-on-Tyne, 400 tons cement, N. McNaughton.

April 12, per Rostrevor, from Whitehaven, 48 tons plaster and cement, 4 tons iron, to order.

April 13, per Bombardier, from Creetown, 225 tons crushed granite, Rome and Co.

April 14th, per City of Brussels, from Antwerp, 34 case Window glass, Plate Glass Company; 30 do., do., W. Collins; 160 do., do., T. C. Martin, Ltd.; 50 do., do., Hoyte and Sons; 6 do., do., De Greele, Hondret, and Co.; 10 do., do., McCulloch and Nairn; 35 do., do., J. Kelly and Son; 118 joists, 5 cases limestone, 2 bags plaster of Paris, to order.

April 17th, per Lord Londonderry, from Baltimore, 830 pieces oakwood, 57 pieces hickory, 592 packages poplar lumber, 65 tons roofing slates, to order; per Village Belle, from Bridgewater, 150 tons bricks, T. Archer.

## "THE LYNCH COMPETITION" FOR PARISH HALL AND LIBRARY.

A suggestion has been made that the design considered most suitable might be adopted for the Model Village Hall which it is proposed to erect in the coming "Munster-Connacht" Exhibition at Limerick, at the instance and with the aid of the Department of Agriculture and Technical Instruction, or, if not, that in any case all the designs possessing merit will be hung in the Hall erected in the Exhibition.

The Committee of the A.A.I. think it well to place this possibility before their members.

The conditions of the competition are not in any way altered. The designs must be delivered at the A.A. Rooms, 15 South Frederick lane, not later than May 1st.

## TUAM WATER WORKS,

## Local Government Board Inquiry.

P. C. Cowan, Esq., M.Inst. C.E., Chief Inspector of the Local Government Board for Ireland, held an inquiry at the boardroom of the Tuam Union Workhouse in reference to the petition presented to the Local Government Board by the Tuam Rural District Council for a Provisional Order under the Public Health Ireland Acts, 1878 and 1890, applying for a loan of £550 for the purpose of improving the waterworks of the town of Tuam.

The Inspector having explained the object and scope of the inquiry,

Mr. M. C. Shine, Waterworks Superintendent, was the first witness examined. He deposed, in answer to Mr. Cowan, that he was appointed superintendent from the start. There was no complaint regarding irregularity or shortness of water in the beginning. The works were completed fourteen years ago. Complaints began about seven years ago. Back water at the wheel was the principal cause of complaint. The great trouble about the back water began about four years ago. The committee laid out about £1,500 on improvements—cleaning up the stream most of the way from the wheel house to the town. The committee cleaned it up every year, and put the excavated stuff on the adjacent bank of the river. The stuff consisted of clay, stones, gravel, and other sediments. It was done under the directions of Mr. Kirwan, C.E. From the start the back water was all the trouble. About 200 houses in the town were taking the water. The reservoir is supposed to contain 900,000 gallons, and to contain a sufficient supply for 14 days' consumption. From 40 to 60 thousand gallons are supposed to be consumed in town per day. He discovered leakage in town three weeks ago, caused by a broken water pipe. The water burst up in the street, but this he got remedied by the insertion of a new 9 foot pipe. In summer it became necessary to cut off the supply at night. In summer the scarcity was found chiefly to exist. The wheel is going on day and night.

Mr. Hosty, solicitor, on behalf of Mrs. Hosty, Mrs. Kennedy, and others of the riparian proprietors along the course of the stream, cross-examined Mr. Shine. Sometimes the pipes were ripped up from the wheel house downwards to try and discover the leakage. The reservoir is now filled to overflowing. It began to fill up two months ago. It began to fill when the leakage was discovered and stopped. The average height of water in the reservoir was about five feet, sometimes less or more. None of the stuff excavated got back into the stream.

Re-examined by Mr. Concanon—New pipes were always put in place of the old ones when it was found necessary.

Mr. James McDonnell was the next witness sworn. In reply to the Inspector he deposed that he was chairman of the Tuam Board of Guardians, Chairman of the Rural District Council, chairman of Tuam Town Commissioners, Director of the Tuam Race Committee, and promoter as well as acting chairman of the Waterworks Committee. (The Inspector laughingly remarked that here indeed was a multiplicity of offices.) He deposed that there is very frequently a shortage of water, caused, for the most part, he believed, by back water. Mr. Mulvaney, their engineer, who was present, suggested what is now proposed to be done, and would have been done, but sufficient funds were not forthcoming. The back water was the sole and only trouble. There may have been, and probably there are, some leakages. The spring weather is nearly always the season of difficulty. He had gone over the plans with Mr. Mulvaney. The works proposed to be done are most decidedly necessary.

Very Rev. Dr. Higgins, President, St. Jarlath's, was next examined by Mr. Concanon. He deposed that for the last four years he has been President of the College, and was previously for three years living there. The college is supplied with water from the works when the water is high enough; when low the supply is short. It was true that sometimes when floods were high they were short of water at the college. Last winter there were high floods, and yet the supply was short. When the water was high in the reservoir the top rooms in the College had a supply, but not otherwise.

Cross-examined by Mr. Hosty—The reason of the shortage was back water, and the wheel not working sufficiently.

Mr. Mulvaney, C.E., was next examined. He stated the works were originated in 1888, and he was frequently called on to examine the state of the works. From time to time they were in trouble about the backwater. When there was lots of water everywhere the wheel was found to be going only four revolutions per minute. He believed that



there was a waste of water no doubt from time to time. The trouble was chiefly in winter. The old wheel was an under shot wheel. The present wheel is the contrary. Mr. Mulvaney gave in detail the several improvements it was proposed to have carried out, and gave a very elaborate explanation of the works suggested in his plans, the deepening, and in some places widening, of the stream, the underpinning of a few bridges, and the acquisition of about 13a. 2r. 26p. of land in all.

Mr. Hosty cross-examined Mr. Mulvaney on behalf of Mrs. Begley, another occupier of the river's banks.

Mrs. Mary Kennedy, of the Curragh, and Mrs. Dillon, of Bishop-street, were examined. They were apprehensive that the proposed improvements might have the effect of flooding their lands injuriously. They were not otherwise opposed to the project.

There was no further opposition, and Mr. Cowan, C.E., and Mr. Mulvaney, C.E., with Mr. Shine, Superintendent, proceeded to inspect personally the river, and the works generally, and the inquiry closed.

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## TOPICAL TOUCHES.

Mr. Banister Fletcher's excellent "History of Architecture on the Comparative Method" is about to be translated into Russian.

In this issue, Mr. John Good, hon. secretary of the Dublin Master Builders' Association, continues, in an able letter, the discussion on the subject of the general conditions of building contracts.

The front of what was until lately Tarpey's Hotel, in Nassau-street, is being converted into shops with offices over. Mr. E. Bradbury is the architect, and Messrs. Harvey and M'Loughlin the builders. "Tarpey's" was established about 50 years ago by the late Alderman Tarpey, sometime Lord Mayor of Dublin, and was in its day well known, chiefly to the country gentry who came to sojourn in Dublin.

On Monday, 23rd ulto., at the Royal College of Science, Stephen's Green, before a meeting of the Engineering and Scientific Association, Mr. W. Brew, M.I.E.E., read an interesting paper on "Alternating Currents." He dealt with the subject in a popular manner, mechanical analogies being used to explain fundamental principles, and experimental illustrations given of some of the latest alternating current appliances.

An important action by Messrs. King and Co., of Liverpool, the well-known heating and ventilating engineers, against the Joint Committee of Management of the Portrane Lunatic Asylum was begun before Mr. Justice Wright last week. The plaintiffs claim a very large sum for the balance of the contract and extras for heating the asylum, and it is further claimed that the defendants waived the clause relating to the architect's certificate, while the defendants deny the accuracy of the claim, and counterclaim for defective work.

The action is one of the legacies of the defunct old Board of Control of Lunatic Asylums to their successors, the County Council.

The Society of Architects, London, has paid a very marked and exceptional compliment to an Irish architect. Mr. William Scott, A.R.I.B.A., of Dublin, has been appointed one of the Society's examiners in Section 1a (planning and design) of the Society's qualifying examination for membership, in the place of Mr. S. Wyborn, resigned. Mr. Scott was himself one of the first candidates for the Society's examination, and was successful in winning the Silver Medal awarded for excellence. He joined the Society in 1899, and is a past member of the Council.

Mr. Scott was a member of Council at a phenomenally early age, and is generally regarded as about the foremost of the new school of young Irish architects that is slowly but surely rising. Mr. Scott has, in company with Mr. Robert Elliott, an occasional correspondent in our columns, just left on an extended architectural tour, embracing Ravenna and Constantinople. In Turkey he purposes making a study of the earlier Byzantine Basilicas.

Mr. Harry Hems, of Exeter, has given a rood screen, valued at 500 guineas, to St. Sidwell's Church, Exeter.

The Corporation of Belfast has given the contract for the plumbing and sanitary engineering works at the new Municipal Technical Institute to Messrs. James Lowden and Co., of that city.

An extraordinary tale of official red-tape—almost too good to be true—comes from Woolwich Arsenal. It seems that a fire breaking out the local brigade was summoned, but, on arriving, could not be admitted within the precincts of the Arsenal without the written authority of some high official!

The Electric Lighting Committee of the Dublin Corporation invite tenders for the erection of an electricity sub-station at Fairview, in accordance with plans, specifications, and conditions of contract prepared by the City Architect, which may be inspected daily (except on Saturdays) at his office, Municipal Buildings, Cork Hill, Dublin.

Most engineers, architects, and builders will be glad to note that the Royal Institute of British Architects has appointed a committee, jointly with other bodies, to draw up rules for the use of re-inforced concrete. This will be welcome news, for although several excellent text books have been written on the subject, and the material has now been a considerable time in use, there is still room for much practical inquiry and for the formulation of simple and useful tables of strength.

In a paper read before a meeting of the Western Society of Engineers, at Chicago, Mr. H. W. Parkhurst presented the results of experiments relating to the best consistency for concrete. The concrete was mixed in the following proportions: Portland cement, one part; sand, two parts; gravel, 2.5 parts; crushed stone, 2.5 parts; and the volume of water in the three mixtures made was as follows: Dry, 0.41 parts; medium, 0.60 parts; wet, 0.76 parts. The concrete was mixed by hand on a platform, and three blocks were made by shovelling the moisture into boxes, made ready near the platform, and the whole was tamped in layers 6 in. thick, as shovelled in. The dry mixture took about twenty-five minutes to put into the box, and no amount of ramming would bring water to the surface. The medium mixture was boxed in twenty-one minutes, and although the top of each layer was flushed by the tamping, the mass was always hard. In the wet mixture, which took twenty-three minutes to fill into the box, the mass quaked easily, and the man could not stand on the top to ram it. After being exposed to sun, rain and snow for ten months the blocks were broken up, when it was found that the texture of the wet and medium blocks was excellent, and that of the dry block was poor. From his experiments, Mr. Parkhurst draws the conclusion that a medium concrete, or one that has not enough surplus water to produce quaking, while enough to permit easy and thorough ramming, is the most desirable. The gist of the paper is found in the sentence: "It is of the utmost importance that concrete shall be consolidated thoroughly by ramming." If it is very wet, ramming cannot be properly performed, and if too dry, no amount of ramming will fill the voids, so as to make a homogeneous mass.



## THE LEGAL RIGHTS AND LIABILITIES OF ARCHITECTS AND SURVEYORS.\*

By H. H. RICHARDSON, Solicitor, Clement's Inn Prizeman, 1879, Hon. M.S.A.

To anyone at all familiar with matters relating to Architects and Surveyors, the subject and proper scope of the present address will be indicated with sufficient clearness by the above title. It may nevertheless be not inappropriate at the outset to point out certain limitations to the generality of the title, and to define a little more clearly the questions proposed to be considered. In the first place, some limitation to the generality of the title is required, because there is a broad and obvious sense in which the rights and liabilities of Architects and Surveyors, or of any other class of professional or business men, are the same as those of any individual members of society, and a consideration of all such rights and liabilities would involve a survey of the entire law as to persons—a task plainly out of the question. It is clear that the purpose of the present address must be limited to the consideration of those rights and liabilities on the part of Architects and Surveyors, which arise from the position in which members of those professions are usually found in relation to their employers, and to other persons who may also be employed in the same matter. It may then be suggested that the subject for consideration should be the rights and liabilities of Architects and Surveyors *as such*; but this limitation would be too severe, for notwithstanding the above title it may with safety be stated that neither Architects or Surveyors have any rights or liabilities simply as such. They do not, like members of the Legal or Medical professions, require any legal qualification to practise, and nothing analogous to the Solicitors' Acts or the Solicitors' Remuneration Act applies to them. They are not subject to any legal restrictions or regulations as to their professional conduct or remuneration. They are not, in fact, protected or harassed, as the case may appear, by any special legislation or rule of law, and any person, however ill-qualified, may set up and practise as an Architect or a Surveyor, or as both, and if being so ill-qualified he can induce the public to employ him, so much the better for him and so much the worse for the public. It is true that as some protection and guarantee for the public, as well as in the interests of the respective professions and for the mutual benefit of their members, Societies of Architects and Surveyors have been formed, and have framed rules as to professional etiquette and remuneration, but these rules only bind the members as a condition of membership. They have no binding legal effect whatever. In this respect the position of Architects and Surveyors is analogous to that of Accountants or Engineers, who are alike free from any legislative trammels as to qualification or professional conduct or remuneration.

What then are the rights and liabilities proper for our present consideration? for, as already indicated, it is obvious to all familiar with the subject, that the position of Architect or Surveyor does frequently and indeed generally give rise to rights and liabilities which may with propriety be described as those of Architects and Surveyors. They will be found for the most part to depend upon the law of Agency, and upon the position in which the Architect or Surveyor is so frequently placed as the Agent of the employer or Building owner in superintending works to be carried out for such employer or Building owner under what is known as a Building Contract.

Attention may here be drawn to the fact that a very great part, if not the greater part, of all legal problems and complications in matters and between persons, of every kind, arise from this law and position of Agency. In Company matters, for instance, as a Company through a "person" in law is incapable of acting except through Agents, scarcely any dispute or point arises into which the question of Agency does not enter. Disputes or litigation between two individuals or parties simply and not complicated by any question of Agency on the part of either of them or of any other parties, are usually of a more or less simple character—apart from the question of torts or wrongs which need not be here considered. Such disputes or litigation are most frequently upon some simple question of Contract, the point being whether there was any and what Contract, whether there has been a breach of it, and what is the legal right or remedy in respect of such breach, and in such cases the question is usually one of evidence rather than law. So it is with simple questions between Architects or Surveyors and other persons directly and apart from questions of Agency. If I employ an Architect to prepare me a plan or a Surveyor to measure up a piece of land or get out some other quantities, and he performs the work with the skill reasonably to be expected from a person holding himself

out to be qualified for such work, he is entitled to be paid the stipulated or reasonable remuneration, and upon his being so paid the transaction is at an end. Such a simple transaction is in all respects similar to a bargain made, for example, with a portrait painter to paint a portrait. I may not like or use the plan prepared for me; I may not like the portrait, and may prefer to hang it in the back bedroom, or with its face to the wall, but if it has been done with such reasonable skill as aforesaid, I am bound to pay for it, and there is an end of the matter. If the usual transactions with Architects or Surveyors were of this simple nature there would hardly be more occasion to consider the rights and liabilities incident to the practice of these professions than there would be to consider those of portrait painters, photographers, or the like, and the present paper might almost end here as a sufficient survey of such rights and liabilities. Such, however, is very far from being the case. The terms of their employment usually involve not only the designing or suggestion of works, but their supervision of the works designed or suggested whilst in progress for the purpose of seeing that they are duly executed in accordance with the plans and specifications. This brings them into relation with other parties, and it is this relationship which gives rise to so many of the rights and liabilities proposed to be considered.

It appears from the foregoing introduction that the particular rights and liabilities so to be considered usually arise under what are known as Building Contracts, or Contracts of the like nature, and that the chief of them are incident to the position of the Architect or Surveyor as the Agent of the Employer. Those familiar with such Contracts are aware that in addition to his position as Agent, the Architect or Surveyor is, for the prevention of disputes, invested with certain judicial or arbitral functions which give rise to other rights and liabilities to be considered in their due place. Having thus outlined the scope of the address and the subjects for consideration, I now propose to deal with those subjects in detail, and under the following heads, that is to say:—

1. The proper qualifications of the Architect or Surveyor.
2. The position of the Architect or Surveyor under simple contracts of employment not involving or apart from questions of Agency.
3. The position of the Architect or Surveyor as Agent of the employer under Building Contracts or the like; and
4. The position of the Architect or Surveyor in his quasi-judicial capacity or as arbitrator under Building Contracts or the like.

### Proper Qualifications.

I have used the term *proper* qualifications advisedly, for it has already been seen that no qualification is legally necessary. Architects and Surveyors, however, are in the position of persons holding themselves out as competent to perform certain work requiring certain skill, and they impliedly guarantee that they have such skill. If, therefore, they do the work so badly or carelessly as to indicate lack of the required skill, they will be unable to recover remuneration for it and might be made liable for damages should loss or injury result from negligent or unskilful work. I believe that in France an Architect has been held criminally liable for the death of a man killed by the fall of a building owing to its defective design, and though I am not aware of any such case in England, circumstances could be conceived in which, under the English Criminal Law, a negligent Architect could be so made liable. As regards the matters in which skill or knowledge is required to make a competent Architect or Surveyor they may be generally stated as follows, that is to say:—

- (a) Skill in the preparation of plans, drawings, or designs suitable for the particular work to be executed or, in the case of Surveyors, skill in the measurement or surveying of land or in suggesting plans or ideas for the development thereof.
- (b) Knowledge of the materials to be used and of the proper application or use of such materials.
- (c) Knowledge of Building Acts and the requirements of Local authorities and of the law as to light and air, support, or other easements.

If through ignorance or neglect of any of these matters on the part of the Architect or Surveyor the work designed or suggested should prove to be impracticable or fail, that would be evidence of such want of proper skill on the part of the Architect or Surveyor as to disentitle him to remuneration. But although persons undertaking to do work requiring certain skill impliedly guarantee that they have such skill, yet if an

\* A paper read before the Society of Architects, London.

employer deliberately employs for the carrying out of important works requiring high and special skill a person whom he knows has not enjoyed a practice likely to give him the requisite experience and knowledge, he would not, in the absence of special guarantee or representations of sufficient knowledge and experience, be entitled to recover damages from the Architect or Surveyor in the event of the work proving unsatisfactory. (See *Macassey and Straham*, on Civil Engineers, pp. 36 and 37, and the case of *Henry and Belfast Board of Guardians*, cited on p. 39.)

As regards requirements (a) and (b) little more need be said. What is expected of Architects and Surveyors in these respects is pretty generally understood. Of course the amount of skill and knowledge required in each case depend upon the nature and importance of the particular work to be done.

As regards (c), it is obvious that a lack of acquaintance with Statutory or Local requirements, or with the rights of adjoining or neighbouring owners, may render a plan or suggested works, however otherwise excellent, impracticable and useless, and it is therefore of the utmost importance that Architects and Surveyors should be thoroughly familiar with such requirements and rights. All men are presumed to know the law—ignorance of it excuses no one—Architects and Surveyors, no less than Lawyers, must carry on their practice under the burden of this stupendous presumption.

In this connection it may be pointed out how important it is to Architects and Surveyors, in their own interests, to know what Contracts—in order to be binding—require to be in writing under the Statute of Frauds and what require to be under seal. Under the Statute of Frauds Contracts relating to land and also Contracts, the performance of which must necessarily extend beyond a year, require to be in writing, signed by the party to be charged, and Contracts with Corporations require generally to be under seal, and Architects and Surveyors, in dealing with Corporations, should therefore be on their guard against relying on memoranda or writings merely signed by an Officer of the Corporation.

#### Position of Architect under Contract.

We may now pass on to the consideration of the position of the Architect or Surveyor under simple Contracts not involving or apart from questions of Agency.

In such cases the position in which the Architect or Surveyor stands towards his employer, is that of a skilled servant, and in it he will be expected to possess and properly display such skill and knowledge as has been already indicated, and moreover to perform the duties he undertakes with such care, attention and fidelity, as to free him from any charge of negligence. The simplest cases of such position and employment are those where the Architect or Surveyor is employed to prepare plans or designs, or make suggestions for works without reference to the question by whom such works are to be carried out, or superintended, or whether they are to be carried out at all. The simple bargain in such cases is—stipulated work to be done with proper skill on the one part, and the stipulated or a reasonable payment thereon on the other.

One or two points, applicable alike to such simple Contracts of employment and to Contracts involving Agency, may be rapidly noticed. As already stated, the Contract may be for a period of employment greater than a year and so may require to be in writing, under the Statute of Frauds, signed by the party to be charged. It may be with a Corporation and so require, generally, to be under seal. The plans, designs or suggestions, may be ordered for the approval of the employer, and, if this is clear, nothing is payable for them unless they are approved or at any rate used. (See *Moffat v. Dickson*, 22 L.J., c.p., 268.)

They may be sent in in response to an invitation to compete, in which case, unless remuneration is offered by the terms of the invitation to unsuccessful competitors, they will not be entitled to any unless their plans or designs are actually made use of. Under this head the question of ownership of plans and designs may be considered. Does the employer, when employing an Architect or Surveyor in the usual way, purchase the plans, drawings or designs, or only the use of them for the purposes of the designed works? It was formerly considered that by the custom of the profession the latter was the case, and that the drawings remained the property of the Architect notwithstanding payment. The contrary, however, appears to be now settled by the case of *Ebbv v. Gowan*—*Times*, of July 7th, 1870—and whatever may be said with respect to the ownership of plans prepared for the purposes of works to be carried out under the superintendence of the Architect, it is impossible to doubt that where an Architect is simply employed to prepare a plan or design without more and without definite agreement to the contrary,

the plan or design would, upon payment therefor, be as much the property of the employer as a portrait ordered to be painted for him and duly paid for. If the effect of the bargain is to give the property or the plans to the employer, it is clear that he can use them for any purpose he pleases, and need not confine their use to the purpose for which they were originally prepared or intended.

The Contract between the employer and an Architect or Surveyor is a personal one, and the employer is entitled to have the work done or superintended by the Architect or Surveyor personally. Consequently the death of the Architect or Surveyor terminates the Contract, though that of the employer does not necessarily do so, and his executors may under the Contract be entitled to have it carried out for the benefit of the employer's estate. Should the Architect or Surveyor die before the completion of the work, and before any payment has become due for it, he would not in the absence of agreement to the contrary be able to recover any payment, but if his services had been retained at a salary he could recover so much of the salary as had become due at the date of the death. (See *Stubbs v. The Holyhead Railway Company*, L.R. 2, Ex. 311.)

Apart from the strict practice of their respective professions, Architects and Surveyors may, like other professional persons, be employed to give evidence before Parliamentary Committees or the like, in support or in opposition to some particular measure—or to give expert evidence in a Court of Law. In such cases they are of course entitled to be paid proper fees having regard to their standing and reputation. They are also in practice frequently employed as Valuers, and although, as before stated, they are not in their ordinary professional capacity hedged about by legislation, yet if they act as Valuers or Appraisers, it appears that they should take out qualifying licences therefor under 46 Geo. III., c. 42, ss. 4 and 7; or 809 Vict., c. 76, sec. 1.

As regards protection from libel or slander, Architects and Surveyors have, of course, the like legal rights and remedies as other people. It would be libellous to write and slanderous to say of an Architect or Surveyor that he was incompetent, or that he had not sufficient skill, knowledge or experience for the carrying out of any work undertaken by him. (See *Botterell v. Whitehead*, 42 L.T., N.S. §88.)

#### Liabilities as Agents.

With this summary survey of the rights of Architects and Surveyors as skilled servants, we may now proceed to consider the more important and, from a legal point of view, more interesting question of their rights and liabilities as Agents or otherwise under Building Contracts or the like. These come under Heads 3 and 4 above mentioned. First then we deal with Head 3, that is to say, the position and authority of the Architect or Surveyor as Agent of the employer. In the simple cases dealt with under Head 2, the Architect and employer are the only persons concerned. When the Architect is employed not only to design the building but to superintend its construction, he is brought into relationship with those who are employed to construct it, and it is this relationship and the duties and liabilities arising in connection with it which are now to be considered. The same lack of personal skill or knowledge which usually precludes a Building owner from designing the work he wishes to have done, precludes him also from seeing that it is done properly by the person employed to do it. He has, therefore, to employ someone to perform this service also for him, and in Building Contracts this person is usually and properly the Architect or Surveyor who has designed it. The owner having satisfied himself that a building or work erected or done in accordance with the prepared plans or designs will be what he wants, employs a Builder or Contractor so to erect or do it, and an Architect or Surveyor to see that it is so erected or done. He thus constitutes the Architect or Surveyor his Agent for the purpose of seeing the desired work carried out. Now Agency is of two kinds. A man may appoint another to be his Agent simply for some particular purpose or purposes—as in the case of an Agent or Attorney appointed to execute some particular deed or deeds, or to give receipts in some particular matters. In such cases the person to whom the deed is to be executed or the receipts given must see that the Agent has that particular power, otherwise he may find that the principal is not bound. He can not rely upon the mere word of the Agent that he has the professed power. On the other hand, he may appoint someone to be his General Agent to do all such things as may be necessary or proper for some purpose or undertaking. In such cases the authority given is an authority to act in a certain capacity for all the purposes of the undertaking in question. A person put for-



ward to act as such General Agent can bind his Principal by all acts within the scope of his employment, although the Principal may have privately limited his authority in particular matters. The position of the Architect or Surveyor under a Building Contract is one of general Agency, and his position as such General Agent, as appears from the leading case of "*Kimberley v. Dick*," L.R. 13, Eq. 1, or where, in connection with the question of the character in which the Architect was to be considered under the term of a Building Contract. "I am of opinion that I must treat Mr. White (the Architect) as the Agent of Mr. Dick (the Building owner) generally, for all purposes connected with this building, and that without any limitation as to price or anything else." The decision of the case upon the point is thus summarised by Mr. Roscoe, in his useful digest of Building Cases:—"The Architect is the Agent of the employer generally for all purposes connected with the erection of the structure of which he has prepared plans, and the erection of which he is to superintend."

The general principle is thus laid down and established. The bearings of it lie, like Captain Bunsby's observations, "in the application of it," that is to say, when any question arises as to the employer's liability for the acts or orders of the Architect or Surveyor, such question will usually be found to depend upon whether such act or order was in fact within the scope of the general authority given.

If an Agent falsely represents that he has an authority which he has not and thereby induces another person to act on the faith of his representation, that is a fraud for which, if the person so induced to act is thereby injured, he could recover damages. (See "*Randall v. Trimen*," 18 C.B. 786.) Of course as between himself and his employer simply the position of the Architect or Surveyor under a Building Contract is still that of a skilled servant, and the same skill, knowledge and care requisite in the preparation of the design must continue to be shown in the superintendence of the work and for any neglect of his duty in this respect the Architect or Surveyor might be made liable. Questions as to the extent of the Architect's or Surveyor's authority under a Building Contract most frequently arise in respect of the following matters, viz.:—

- (a) Alterations and deviations from plans.
- (b) Extra work.
- (c) Authority to employ Quantity Surveyor, and
- (d) Certificate.

In properly drawn Building Contracts all these matters are carefully provided for, and in so far as they are so, the rights and liabilities of the parties will be determined by reference to the particular provisions. In the absence of special provision, the authority of the Architect as the General Agent of the employer does not extend so as to entitle him to permit any alterations or a deviation from the accepted plans, or to order any extra work to be done. If, therefore, he permits or orders any such alterations or extra work, he will not thereby bind the employer, and may render himself personally liable to the Contractor. Of course in all these cases the unauthorised order may be accepted and ratified by the employer, but Architects and Surveyors will be well advised to avoid any risk by keeping well within the bounds of their general authority, as limited or extended by the Contract, and in the event of anything appearing desirable to be done, but of doubtful authority, to obtain clear written directions and authority for the execution of any alterations or extra work.

It is usually provided that no extra work shall be done without a written order of the Architect, and in such a case a written order is a condition precedent to payment for such work, and its mere inclusion in an interim certificate will not prevent the employer from objecting to payment on final adjustment. (See "*Tharsus Sulphur, etc., Co. v. McElroy*," 3 App. Cas., 1040.)

In the course of a comparatively short paper like the present, these and similar questions of detail can only be briefly touched upon. It is sufficient to keep in view the position of the Architect or Surveyor as Agency and the main principles of the Law of Agency, viz., that the Agent must not exceed the limits of his authority, otherwise the principal will not be bound, and that persons dealing with the Agent must be satisfied that he has the authority he claims, either under the instrument of his appointment or as coming within the scope of authority as General Agent for the purpose in hand.

As regards (c), it does not appear to have been anywhere laid down that power to employ a Quantity Surveyor comes within the scope of the Architect's authority simply as agent of the employer under a Building Contract, and his right to do so, if it exists, appears to depend upon custom. (See "*Moon v. Witney Union Guardians*," 3 Bing, N.C. 814.)

(d) Certificates. The position of the Architect or Surveyor with respect to the giving or withholding of certificates is of the highest importance and may be regarded from the point of view of the Architect or Surveyor—(1) as skilled servant; (2) as agent of the employer; and (3) as Arbitrator. As skilled servant he must have and use the skill necessary to show that the work certified for has been properly done and failure in this respect will amount to negligence for which he will be liable to his employer.

(2). As Agent of the Employer he must act in his interest without collusion or any other surreptitious dealing.

(3). As Arbitrator he must honestly and impartially exercise the quasi-judicial functions entrusted to him.

In granting or withholding certificates the Architect's conduct (apart from collusion or fraud) cannot be impugned and his decision is final. But wilfully to certify work to be done when it is done is a fraud upon the employer, for which he would be liable, and collusively to withhold a certificate properly due would be a fraud upon the contractor. But mere negligence or want of skill in granting or withholding a certificate is not sufficient ground for impeaching the certificate, though as regards the employer whose skilled servant he is, negligence in granting a certificate for work not properly done would render the Architect or Surveyor liable.

The almost autocratic power put into the hands of the Architect under the usual terms of a Building Contract, has often been alleged as a ground of complaint on the part of the builder or Contractor—whether such complaint is just, or what alterations likely to be accepted are proposed, would be fitting and interesting subjects for discussion in a paper on the rights and liabilities of Builders and Contractors—suffice it to say here that, owing to competition, the employer is generally in a position to dictate his terms, and that, from the point of view of the Architect or Surveyor, he very naturally claims not only as Agent of the Employer, but in the interests of his own reputation, to be put into a position which will enable him to see that the works designed by his skill are not jeopardised by any want of skill or care or honesty on the part of those employed to carry them out. Even-handed justice to the Contractor must be what no doubt in the vast majority of cases is found—the fairness, integrity and high-mindedness of those into whose hands these powers are put.

This brings us to the last of our four heads, namely (4) The position of the Architect in his judicial capacity or as arbitrator. This, as has been seen, arises to some extent in connection with the question of Certificates, but what is here more specially referred to is the position of the Architect or Surveyor as dispute preventer. If it is clear from the Contract that the parties have agreed that he shall so act, they must be taken to have conferred upon him a judicial capacity.

His decision is final, unless some appeal is provided, and cannot be impeached for want of proper care or skill or upon any ground but that of fraud. There is no more familiar legal dictum than that fraud vitiates everything, and so it will vitiate the decision of the most fully empowered judge or arbitrator. Nor must he do or be party to anything which would interfere with the proper impartiality of his position. Upon this point there is an interesting decision—that of "*Kemp v. Ross*," 1 Giff., 258, where an Architect having undertaken to his employer that the cost of the proposed work should not exceed a certain sum, it was held that he did not possess a sufficiently unbiassed mind to make his decision against the Contractor just and conclusive.

The above survey, though necessarily very incomplete and imperfect, having regard to the many points in the position of the Architect or Surveyor under Building Contracts, will, it is hoped, suffice to show the general principles upon which questions relating to such positions must be decided, that is to say, the principles applicable to the relationship of (a) employer and skilled servant; (b) Principal and Agent and scope of Agent's authority; and (c) arbitrator and disputants. Many interesting subsidiary questions remain to be considered, such for instance as the position and right of appointment of Clerks of the Works, the particular duties of Quantity Surveyors, the position of Architects or Surveyors with respect to questions of light and air, or the like. These, however, do not give rise to any different rights or liabilities, and are sufficient in themselves for independent papers. Nor has any attempt been made to deal largely with authorities, for a discussion of these to be of any use would leave insufficient time for the setting forth of those general principles upon which all such authorities are based, and which it has been considered (apparently not without reason) would afford sufficient material for the purposes of a single address before this Society.

## CORRESPONDENCE.

## CONDITIONS OF CONTRACT.

(Letter from the Secretary of the Master Builders' Association.)

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR SIR,—I have read with much interest the articles and letters appearing in your columns on the subject of the Conditions of Contract, and quite sympathise with your correspondent, "Simplex," in his desire for a meeting for the purpose of discussing the various aspects of this difficult problem; such intercourse, when properly conducted, could not fail to lead to a better understanding, and it is a matter for regret that we in Ireland have not more opportunity for discussing our difficulties and our differences.

The Conditions of Contract have been the subject of a continuous correspondence between the architects and builders of our city for almost the past ten years, and intermittently, I understand, for a long period previously, yet there has never been any meeting or opportunity for exchange of views, with the result that little progress has been made. In England and Scotland the matter was differently treated; sub-committees were immediately formed of architects and builders, and these in both cases succeeded in coming to conclusions satisfactory to both parties, though not until the subject had engaged a very considerable amount of time and attention.

You refer in a leader to the length of the proposed new conditions. For obvious reasons conditions should be brief and the clauses should also be as clear and as specific in their terms as it is possible to make them. This will be at once apparent from a comparison of the following figures giving the numbers of paragraphs in the different forms of contract. I have taken paragraphs in preference to clauses, as the latter have been so subdivided in our Dublin forms as to make an unreliable basis for comparison:—

	English (R.I.B.A.)	Scotch.	Old Dublin.	New Dublin.
No. of paragraphs	32	23	42	56

In the discussion on Mr. Owen's paper at the meeting of the Architectural Association the subject of quantities forming part of the contract was referred to. Opinion on this important point is becoming more reasonable, and is gradually concentrating. Why the surveyors should have been permitted for so long to refuse to be responsible for their work, and that this burden should be borne by contractors, is a question to which there does not appear to be any answer. A comparison of the position of this matter in the sister isle may be interesting, so I append the clauses in the English, Scotch, and Dublin Forms:—

## ENGLISH (R.I.B.A.) FORM.

"Should any error appear in the bills of quantities other than in the contractors' prices and calculations, it shall be rectified, and such rectification shall constitute a variation of the contract, and shall be dealt with as hereinafter provided."

## SCOTCH FORM.

"The works shall be carried out in accordance with the directions and to the satisfaction of the architect, and in accordance with the plans, specifications, and schedules of quantities, and in accordance with such further drawings and details and instructions in explanation of same, as may from time to time be given by the architect."

## DUBLIN FORM.

"The prices in the detailed estimate furnished by the contractor to the architect marked — shall form the basis for calculating the value of all additions, omissions, or variations (unless it should appear at any time that such prices have not been fairly made up), and as a schedule of prices shall stand as a part of this contract, but the employer shall not be responsible for omission of items or accuracy of the quantities."

It is not generally known that all candidates for membership of the Quantity Surveyors' Association in London must agree to be personally responsible for the accuracy of their quantities. The reason for this is that this Association considers it a reflection on their profession to refuse to be responsible for their work.

The subject of arbitration has given most trouble to those entrusted with the drawing up and settlement of conditions. The ideal position undoubtedly for an architect is that of an arbitrator between the two parties to a contract. To be an arbitrator implies that one shall have no interest in the issue, either directly or indirectly. Competition for business, however, on the one hand and a desire on the part of the building owner on the other, has led to a departure from this excellent starting point, and what are known as the agency clauses have crept into the modern conditions of contract, whereby the architect has become and is now

recognised as the agent of the building owner. Whether this development is desirable I do not propose to discuss, but the fact remains, and the proposed new conditions have developed these agency clauses to an extent far beyond any other conditions in use at the present time.

It is obvious that one cannot be an agent and an arbitrator—in the true sense—at the same time. How often are we told that to agree with a manifestly fair course would result in falling out with a client—a serious difficulty, particularly in view of the keen competition which now exists, but how is it to be met? Some will argue that the architect should face the music. How many will? However, there is really no occasion to force the issue to this result, under a properly drawn-up set of conditions.

All differences should be referred to arbitration, and appoint some independent architect mutually agreed on when signing the contract for this purpose. This would avoid all such difficulties.

It is not uncommon for the building owner to so tie the hand of the architect that the progress of the work is impeded, often to a serious extent, to which there is no redress. Would not an arbitration clause be a boon in such instances?

There are many other reasons which one might urge in favour of this course, but I fear I have already trespassed too much on your kindness.—I remain, yours faithfully,

JOHN GOOD.

55 Great Brunswick-street,  
Dublin, 1st May, 1906.

## THE ROYAL HIBERNIAN ACADEMY EXHIBITION.

## SECOND NOTICE.

We recently paid another visit to the Exhibition and spent some little time in the architectural room, although the few exhibits were exhaustively dealt with in an appreciation by Mr. H. J. Leask that lately appeared in our columns. The chief thing that struck us, as it did our former contributor, was the predominant position of Mr. Arnold Mitchell's exhibits, which display both excellence of design and beautiful rendering in water colour and wash. The best of the Irish exhibits are furnished by Mr. William Scott, whose contributions show a grasp of design as well as originality that is both fresh and welcome. It shows that there are the germs of an Irish architectural school existing, a school which might and ought to attain to as high a position as the Scotch. The other works have already been fully dealt with by Mr. Leask.

The pictures in the general exhibition are, as already noted, hardly equal to the standard of the past few years, for since the advent of Sir Thomas Drew as president there has been a general improvement in the character of the exhibition as a whole, albeit that was chiefly due to English aid. As a national exhibit of the painting art of the country, the exhibition is not encouraging, but, then, what can be expected under the existing conditions under which art struggles in this country. Nevertheless, there are very many pictures of high interest and merit, and some of the local artists, like Mr. William Orpen, Mr. Alexander Williams, and Mr. Joseph M. Kavanagh, still hold their own in their own particular lines. A number of the best pictures are, however, by other than Irish artists. An interesting picture is "La Malade," a Breton interior. The old woman in high, carved old Breton bed is realistic and forceful.

Mr. Nathaniel Hone sends a Donegal scene which aptly depicts the wild cliffs of that rock-bound Northern coast. Mr. Alexander Williams has fewer pictures than usual, but they are all good.

"The Scarlet Letter" (suggested by Nathaniel Hawthorne's famous novel of that name), by Norman Garston, is a nice composition, but somehow not altogether satisfactory.

Mr. Kavanagh has quite a number of his pleasant, characteristic views framed in his own special ebony frames, and they are all excellent. About the best of his is "The Masque of Silence."

The portrait of Lord O'Brien of Kilfenora, by Count Casimir Markiewicz, is a good likeness, but wanting in force and character. "Mr. William O'Brien," by William Orpen, is full of strength and vigour as a picture, and there is something notably artistic about it.

A really fine head is entitled "The Saint of Poverty," and is also by William Orpen. The portraits of "Hilda and Thomas, children of R. A. Egerton, Esq.," by Alice Grant, and "Fraulein Fredenhall," by J. B. Yeats, are fine, particularly the latter, as is also this artist's portrait of Standish O'Grady.

A very charming picture is the "Madonna," by Melton Fisher, a rather original representation, in which the Madonna is depicted as a very young and beautiful girl.

"The Investiture of the Right Honorable Lord Mayo as



Knight of St. Patrick," by Count Markiewicz, is scarcely worthy of the artist's reputation, in fact, it is amateurish looking, and the faces are hardly recognisable. Of course, the ceremony itself, although a brilliant one, full of colour, is yet not easy to successfully group as a picture. It is apt, like all such scenes, to become hard and diagrammatic in execution.

Mr. Charles Russell has two good portraits hung, both capital likenesses, one of the Duke of Richmond, better known as Lord March, the other Mr. S. Goehagan, C.E.

There are some excellent landscapes, amongst which may be noted "St. Vallery-sur-Somme, Picardy," by W. H. J. Boot, R.B.A., and "Old Cottages, Howth," by Bingham McGuinness, and "A Herefordshire Lane," by J. Aumomier, R.I. There is a rather good portrait of "John Mulhail, Esq.," by Sarah C. Harrison.

Miss D. Elvery sends a rather notable portrait entitled simply "A Portrait." "Ludgate Hill from St. Paul's," by Edgar Thomas Wood, is worthy of notice, because of the fine atmospheric effects. Mr. George Coffey shows a couple of pleasing French sketches, while we must not omit mention of two others of Mr. J. B. Yeats's portraits, "George Moore, Esq.," and "Mrs. T. W. Russell."

A fine water-colour of good architectural character is "A Tomb on the Appia," by Onorato Carlandi, very fresh and vigorous in colouring.

The collection of sculpture is this year decidedly better and more numerous than heretofore. The bust of his Eminence Cardinal Logue, by Miss Kathleen Shaw, is really good and a capital likeness. The same lady exhibits a fine medallion portrait. The bust of the late Bishop O'Brien, to be placed in the Library of T.C.D., Miss Blanche Stack, sculptor, is good too. A couple of studies by Oliver Sheppard are interesting.

It is most hopeful to see this small but distinctly meritorious revival of sculpture in Ireland, and it is to be hoped that slight as it now is, it may lead to better things in the near future.

We noted with great regret that, up to the present, extremely few pictures have been sold; in fact, it seems as if year by year the sales decline, and that we are within measurable distance of the time when they will altogether cease. We have often advocated the duty of municipalities and other important public bodies encouraging art by the purchase of pictures of real merit by natives. Suppose even a few important bodies like the Corporation and Chamber of Commerce of Dublin were to purchase even one good picture every year what a stimulus it would give to art. The cost would never be noticed, and in time the educational value of such public collections would be considerable. The duty of Government, the municipalities, and the more affluent sections of the public generally towards art has been shamefully neglected. That we have a school of painting, or even the remnants of one, still remaining to us, is, under the circumstances, greatly to be marvelled at.

**Architects' Failings**—The majority of commercial men look upon the architectural profession as a body of unbusiness-like men with whom one must perforce deal, and they come more or less prepared for the worst; the low esteem in which the profession is held by the public is undoubtedly traceable to this. Architects have to deal with their clients' money, and yet in many cases they hardly understand the rudiments of commerce.—*Builders' Journal*.

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## OUR SOUTHERN LETTER.

(FROM OUR CORRESPONDENT).

### Railways.

A meeting of the residents of the various towns and districts interested in a proposed railway extension in South West Cork was held in the Courthouse Union Hall, at which was discussed the ways and means, advantages of such an extension, and also the probable routes. After some exchange of views it was decided unanimously that an appeal be made to the Government to make a sufficient grant to construct and equip a line from Glandore Harbour to the existing railway station at Clonakilty, via Leap, Madranna, Clononagh, Benduff, and Rosscarbery.

It was considered that the proposed railway would have the effect of developing the agricultural industry of the district, the fishing industry at both Glandore and Castletownshend Harbours, and the slate quarries at Benduff and Madranna. The proposed line would be worked in connection with the Clonakilty extension of the Cork, Bandor, and South Coast Railway. At present the only way to get to Glandore Harbour overland is by car from Skibbereen, which means a six miles' drive.

The promoters and engineers of the three schemes for the Cork Junction Railways are now busily engaged preparing their statements and getting together their particulars so as to be able to state to the Committee of the House of Commons the respective merits of the schemes.

### Waterworks, etc

The Middleton Urban District Council have received a reply from the Local Government Board in reference to their application for a loan of £1,600 for the purpose of improving the water supply of the district. The Inspector has made the following suggestions:—That instead of laying a 7in. pipe in place of the existing 5in. main, that an independent 3in. pipe be laid to Ballinacurra. He also suggests that more detailed drawings be submitted, that the reservoir walls be increased in thickness, and the filling outside should have a flatter slope. He also recommends that the consent of the Rural District Council be obtained. The Council decided to send a copy of the resolution to their engineer, but they did not appear to be in favour of adopting the suggestions of the Inspector, and preferred to adhere to their original scheme.

The Local Government Engineering Inspector, Mr. P. C. Cowan, held an enquiry into the application of the Cork Rural District Council for the loan of £400 for the purpose of providing a water supply for the village of Knockraha. Messrs. D. J. Coakley and R. Evans, engineers, explained the engineering features of the scheme.

The Mitchelstown Rural District Council have received a reply from the Local Government Board in reference to their application for a loan of £2,000 for the purpose of lighting the town of Mitchelstown by means of electricity. The reply points out that the application should be amended, increasing the amount to include the sum of £2,319 stated in the detailed estimate, and also should include the following items as recommended by the Inspector—Duplication of the machinery, as in the case of a breakdown of the turbine or generator the electric supply would be interrupted; also a spare armature for the generator should be provided to lessen the chance of failure in the supply of electricity.

The decision given by Mr. Justice Wright in the case of Mr. Samuel Hill, builder, Cork, v. The County Councils of Galway and Roscommon, will prove interesting to both builders and architects. The claim made by the builder was in connection with the construction of Ballinasloe Asylum, and the total amount of work done represented a sum of £52,805. In this case the County Councils took on themselves the responsibility of repudiating their own architect's certificate. Mr. Samuel Hill naturally disputed their right to do this, and claimed the amount of the certificate. The judge tried the case without a jury, but was assisted by Mr. A. O. Murray, architect, Dublin, who acted as assessor, and after a hearing lasting three days found for the plaintiff for balance due, £4,687, and the County Council's counter claim was dismissed with costs. The defendants had lodged £4,100 in Court to satisfy the claim. This being insufficient, the verdict given was in favour of the plaintiff.

### BOOKS RECEIVED.

Architectural Association Sketch Book, Third Series, Vol. 9. Edited by William G. Lewis and Theodore Fyfe. London: The Architectural Association, 18 Tufton-street, Westminster, S.W.

## RIGHTS TO LIGHT AND AIR: HOW ACQUIRED AND LOST.

By W. JOHNSON-ROBERTS, SOLICITOR.

(Special to the Irish Builder and Engineer.)

It may be well, before entering in detail into the present state of the law appertaining to light and air, shortly to recapitulate the legal position of these rights in the past.

In the middle ages the right to light and air depended on prescription, which is a title arising by long use or custom.\* Justice Markham properly defined the basis of the law of rights to light and air in a case dating as far back as the reign of Henry VI. He said: "If I have a house by prescription upon my soil, and another erects a new house upon his own soil next adjoining, so near to my house that it stops the light of my house, this is a nuisance to my house, for the light is of great comfort and profit to me."<sup>†</sup>

Justice Markham's dictum above quoted shows that the true basis of an action for loss of light and air lies in the fact that the loss complained of amounts to a nuisance.

Whitlocke, C.J., further defines the essentials to success in an action for loss of light and air. He says: "Like to the case where a man hath a house with windows in it, and another stops the light, then he may have an action upon the case; but true it is that he shall not only count for the loss of the air, but also he ought to present that time out of mind light had entered by those windows."<sup>‡</sup> Taken in conjunction with Justice Markham's dictum above quoted we have two things laid down as necessary to constitute such an infringement of the rights to light and air as the law will take cognizance of. One, that the infringement complained of amounts to a nuisance, and the other that the right to the light existed "time out of mind." With the exception of the fact that the 2 and 3 Will. IV., c. 71, substituted a period of twenty years for "time out of mind," the law on the subject is to-day as it was in the reign of Henry the Sixth.

It was soon discovered that "time out of mind" and "time during which the memory of man ran not to the contrary," and "time immemorial," were very inconvenient starting points. Therefore, by a kind of general consent, the dawn of legal memory was fixed at the commencement of the reign of Richard the First. As the reign of Richard I. receded more and more into the misty past, the absurdity, and in many cases impossibility, of utilising it as a legal base became more and more apparent. There is a case on record which was tried in one of the latter years of Elizabeth's reign which gave its death-blow to the ridiculous rule as to the date from which the existence of the right should be proved. In this case, after the plaintiff had obtained a verdict for infringement of his ancient lights, the Court granted an arrest of judgment on the defendant showing that the plaintiff's windows had been built in the reign of Queen Mary, and this although he had been in undoubted enjoyment of the light through them for a period of over thirty years. In the year 1623 a Statute of Limitation was passed which indirectly had the effect of abolishing the fixed date for commencement of the right and substituting in its place a period of twenty years. This Act limited the time within which land could be recovered by ejectment to twenty years. As a proper supply of light is a necessary adjunct to the enjoyment of a house, and as the law confirmed a man in his possession of it after twenty years' undisturbed enjoyment, it was held that the statute gave a similar confirmation of his rights to light after a similar period. Chief Justice Wilmut saying: "If my possession of the house cannot be disturbed, shall I be disturbed in my lights?" Yet it should be borne in mind that even after the lapse of twenty years an absolute right was not created, but in the event of proof of twenty years' enjoyment having been given the Court would direct the jury to find that there had been an agreement between the parties granting the right, or, in other words, that the right arose by grant. The Courts merely presumed the existence of a grant, which presumption could be rebutted. (See *Darwin v. Upton*, 2 Wms. Saunds., 175b.) In *Daniel v. North* (11 East, 372) it was decided that where one tenant permitted another tenant to enjoy a right to light for twenty years it did not give to the latter any right as against the owner of the reversion.

Almost from the days of Justice Markham, in the reign of Henry VI., until the decision in *Coll v. Home and Colonial Stores, Limited*,<sup>§</sup> which was decided in

the House of Lords in the year 1904, the law as to rights to light and air has become more and more complex and conflicting, the origin and nature of the right more and more obscured, and the effect of the Prescription Act more fiercely debated. The effect of the decision in *Coll v. Home and Colonial Stores, Ltd.*, is to restore the law of light and air to its pristine condition and elucidate the effects on it of the Prescription Act (2 and 3 Will. IV., c. 71) and of the many decisions relating to the matter. Lord Macnaghten, when delivering his judgment in the House of Lords in that case, said: "It must be regretfully admitted that the numerous decisions on that subject in the Courts are not easily reconcilable, and are not infrequently contradictory." As we have stated previously, by a legal fiction anyone who had enjoyed a right to light and air for twenty years was supposed to have done so by reason of a prior grant. This fiction was abolished by the Prescription Act, which substituted in its place a period of enjoyment of twenty years.

Section 3 enacts: "When the access and use of light to and for any dwelling-house, workshop, or other building shall have been actually enjoyed therewith for the full period of twenty years without interruption, the right thereto shall be deemed absolute and indefeasible, any local usage or custom to the contrary notwithstanding, unless it shall appear that the same was enjoyed by some consent or agreement expressly made or given for that purpose by deed or writing."

Section 4 enacted: "Each of the respective periods of years before mentioned shall be decreed and taken to be the period next before some suit or action wherein the claim or matter to which such period may relate shall have been or shall be brought into question, and no Act or other matter shall be deemed to be an interruption within the meaning of the statute unless the same shall have been or shall be submitted to or acquiesced in for one year after the party interrupted shall have had or shall have notice thereof, and of the person making or authorising the same to be made."

## How Rights to Light and Air may be created.

The right to light may arise by grant express or implied, or by prescription, i.e. (in this case), continuous user for twenty years. Where the right arises by express grant as under a deed, its production is the only evidence required to sustain the claimant's case. Where an implied grant is relied on, same may be proved from documentary evidence, such as maps, etc., showing or referring to it, which were at the time brought under the notice of the owner of the servient tenement and to which he did not object, or from the acts of the parties.

In a case reported in C.B. 7 N.S., 231, Lord Eldon says, "that this Court will not permit a man knowingly, though but passively, to encourage another to lay out money under an erroneous impression of title; and the circumstance of looking on is, in many cases, as strong as using words of encouragement." It may be well to remember that it has been recently decided in the Court of Appeal that a conveyance of a plot of ground with a house erected thereon conveys also a grant of light from the adjoining land, even though the map on the deed of conveyance showed the plot of ground forming the servient tenement to have been marked "building ground." *Palmer v. Fletcher* is another example of implied grant. The owner of a plot of ground built a house on portion of it, which house he sold to the plaintiff; he then sold the residue of his land (which adjoined the plot already sold) to the defendant. It was held that the defendant, standing in the position of the original owner, could not derogate from his own grant, and was unable to act otherwise than the builder himself could have acted. If he had sold the land first and kept the house he might have obstructed the lights (per Kelynge, J., in the same case). Lord Holt, referring to the rights of the vendor in *Palmer v. Fletcher*, says: "If he had sold the vacant piece of land and kept the house, without reserving benefit of the lights, the vendee might build against his house."<sup>‡</sup> Of course this decision does not prevent the owner from building on his ground so long as he did not obstruct the lights of the house he sold.

Outside the rights to light which arise by grant, express or implied, we have the class which depends for its existence on the Prescription Act (2).

Before considering this class it may be well to remark that the dominant tenement is the premises in whose favour

\* See Latham's "Treatise on the Law of Window Lights."

† 22 Hen. VI., c. 13; Vin. Abr. Nuisance, C. pl. 10.

‡ *Sarg v. Pagol*, Pop. 866; Tudor's Leading Cases in Conveyancing, 567.

§ See also *Dand v. Mosely*, cited 9 Rep. 18a, and *Hughes v. Keene*, Vol. 215.

|| *Bowry v. Pope*, 1 Lev. 168.

‡ See *Bury v. Pope*, supra.

§ (1904) L.R.A.C., 179; L.I. 73, Ch. 464; L.T. 90,687.

\* *Broomfield v. Williams*, 66 L.I. Ch. 305.

‡ *Tenant v. Goldwin*, 2 Lord Raymond, 1699 (1704).

‡ 2 and 3 Will. 4, c. 71. (c) See p.—note.



the right to light exists, and the servient tenement is the premises which are subject to such right.

**"When the time commences to run."**

It is manifest that so long as the possession of the dominant and servient tenements are separated and are in the one person the Prescription Act is quiescent. The twenty year period mentioned in it does not commence to run until the dominant and servient tenements are separated, and are in the possession of different persons. That they are owned by different owners would appear to be insufficient. This point arose in *Harbridge v. Warwick*.<sup>\*</sup> In that case the plaintiff was for many years the owner and occupier of a freehold house. During the entire of his occupancy he rented a garden adjoining. He surrendered the garden to its owner, who built a wall which seriously interfered with plaintiff's lights. Although plaintiff showed he had the benefit of the light for over sixty years, yet the unity of possession which existed during that period prevented the creation of an easement. It was only when the unity of possession was terminated by the surrender of the tenancy of the garden that time commenced to run in plaintiff's favour.

It must be clearly understood that even at the present day after the lapse of twenty years of undisturbed possession the owner of the dominant tenement has still only an *inchoate* or incomplete right *until and until his title to the easement is brought into question in some suit or action*. That this is clearly the case can be seen from the wording of the 4th Section of the Prescription Act, which directs the period for the calculation of the twenty years to "be deemed and taken to be the period next before some suit or action wherein the claim or matter to which such period may relate shall have been or shall be brought into question." Lord Macnaghten, delivering his judgment in *Colls v. Home and Colonial Stores, Ltd.* (supra), says:—"Unless and until the claim or matter is thus brought into question no absolute or indefeasible right can arise under the Act. There is what has been described as an inchoate right. The owner of the dominant tenement after twenty years' uninterrupted enjoyment is in a position to avail himself of the Act if his claim is brought into question. But in the meantime, however long the enjoyment may have been, his right is just the same, and the origin of his right is just the same as if the Act had never been passed. No title is as yet acquired under the Act." When delivering his judgment in the same case, Lord Lindley says:—"The language of Section 3 of the Prescription Act, 1832, shows that, in order to acquire a right to light, there must be, first, access and use of light, not access alone. Access is here understood to refer to free passage of light over the servient tenement. See per Lord Justice Fry in *Scott v. Pope*, and per Mr. Justice Kay in *Cooper v. Straker* (59 L.T. 849; 40 Ch. D. 21). Secondly, such access and use must be to and for some dwelling-house, workshop, or other building, as to which see *Harris v. De Pinna* (54 L.L. 38, 770; 31 Ch. D. 238). Thirdly, such access and use must be actually enjoyed therewith. Fourthly, such enjoyment must be without interruption for twenty years. Fifthly, if all these are proved, the right to access and use of light so enjoyed becomes absolute." This, of course, in no way alters what has been said about the time from when the period of twenty years is to start. After quoting several authorities in support of the above proposition, his Lordship proceeds:—"These decisions show that a right to light may be acquired in respect to a house which has stood for twenty years without being occupied or even furnished so as to be fit for occupation, and the fact that shutters have been closed for some months at a time does not prevent the acquisition of a right to light through the windows."

Enjoyment of the right to light for any period over nineteen years—say, 19 years and one day—is sufficient to give the owner of the dominant tenement practically all the benefits of the Prescription Act. This arises by reason of the fact that by Sec. 4 of the Act twelve months' interruption of the enjoyment of the light claimed by that owner of the owner of the dominant tenement is necessary in order to defeat his claim, and once the twentieth year is entered on it is manifest such interruption could not occur. *Flight v. Thomas*, 11, A. and E. 688; 8 Cl. and F., 231.) However, until the full completion of the twenty years his right is inchoate or incomplete, and the Courts will not interfere until the full time has expired. (*Lord Battersay v. The Commissioners of Sewers* (2 Ch. 708, 1805); *Bridewell Hospital v. Ward* (62 L.J.Ch. 270, 893).

**BUILDING TRADES EXHIBITION AT MANCHESTER.**

For the past ten days a Building Trades' Exhibition has been in progress at the St. James's Hall, Manchester, under the management of Mr. Walter Cawood. The position of Manchester both geographically and commercially makes it one of the most important distributing centres in England for the building and allied trades. The district around the city is more thickly populated and contains more wage earners in a given area than any other centre in England, and for this reason the Exhibition is one of the most important of its kind ever held in the provinces. The Exhibition is small but very interesting, and though the attendance of visitors was not great on the occasion of two visits paid by a representative of the IRISH BUILDER, he was assured that good business was being done, and that the right class of people was in the hall. This is the first Exhibition held under the management of Mr. Cawood, and the success it has achieved augurs well for future enterprises of the same description. The band of the Yorkshire Hussars, under the conductorship of S. Cramer-Suckley, Esq., discussed a fine selection of music on each of the days during which the Exhibition was open. The following are some of the chief exhibitors:—

Messrs. C. Chancellor and Co., 13 Clerkenwell-road, London, had a fine exhibit of their celebrated Velure paints and other specialties. Velure is a perfected japan paint, possessing characteristics unsurpassed by any on the market. On this stand also were shown "Stripso" for stripping paint and varnish, Velure floor paint, "Fumood," and Becker's Simplified Roofing, a cheap and well-tested covering material suitable for all classes of roofs.

The Clipper Belt Hook Co., 251, Deansgate, Manchester, exhibited their "Anchor" Patent Wall Ties for all kinds of brickwork; "Eesyfix" Gate Hangers, a simple and efficient method of building gate hangers into walls; "Clipper" belt shifters, girder clips, and other useful specialties.

Messrs. Mellows and Co., Ltd., Sheffield, had near the centre of the hall an imposing exhibit, consisting of an iron and glass structure glazed on the "Eclipse" Patent Roof Glazing system. This method of glazing, which has been amply tested, dispenses with the use of putty, paint, and asbestos, and no maintenance is required. A spray of water was kept constantly playing on a portion of the glass roof to represent the effect of driving rain on the glazing. Samples of lead piping for a variety of purposes were also exhibited here.

Messrs. Hughes and Stirling, Arundel-street, Strand, London, W.C., showed a model of their "Sterling" Refuse Destructor, showing to scale a pair of standard furnaces having a supplementary combustion and dust depositing chamber in the centre common to both cells, and capable of admitting an ox whole or large infected mattresses. The "Sterling" Refuse Destructor has been erected with success in many towns in England and on the Continent, and it embodies sanitary and steam-raising qualities unsurpassed by any plant of its kind.

The "Kleine" Patent Fire-Resisting Flooring Co., Ltd., 9 St. Helen's-place, London, E.C., had the first storey of a warehouse built to show their fire-resisting flooring. This is a perfectly level flooring constructed with ordinary rectangular bricks to carry any load. It is constructed in spans of from 6 to 20 feet, and is a light and cheap flooring. This was one of the most interesting exhibits in the building.

The Hempstead Patent Brick Co., Hemel Hempstead, Herts., had an exhibit comprising some excellent structures showing porous terracotta fireproof blocks and fireproof doors.

The British Metallic Roof and Construction Co., Ltd., Eaglescliffe, Durham, exhibited a summer-house built on this company's patent interlocking system.

The Ford Stone Co., 4 Victoria-arcade, Manchester, had a fine exhibit of Ford Stone, a really marvellous imitation of the natural article. This stone is produced entirely from sand and lime by a patent process, and withstands a crushing weight of close on 700 tons per square foot.

Messrs. John Gough and Co., Newcross, Manchester, showed wood mantelpieces, overmantels, fire grates, linoleums, carpets, rugs, and a fine display of plate glass in bevelled, silvered, embossed, and brilliant cut plates.

Messrs. Kirchner and Co., Tabernacle-street, London, E.C., showed some of their celebrating wood-working machinery, consisting of the following:—General wood worker, new patent band sawing machine, improved panel-planing and thickening machine, four-cutter planing and moulding machine, improved rising table saw bench fitted with patent continuous roller feed.

Messrs. H. J. and C. Major, Ltd., Bridgwater, the well-known tile manufacturers, had a fine exhibit showing the various tiles manufactured by them.

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## THE GARDEN CITY IN BELFAST.

We are all familiar with the interminable rows of hideous little red brick houses that disfigure the minor suburbs of every great city, or the "outlets" as they are vulgarly, but expressively, termed in Ireland. We all equally well know the process by which they are evolved, for many an acre of orchard and pleasant green field has been sacrificed to them amidst once beautiful country-like lanes around Dublin during the past thirty years, and in the stead of a pleasant almost sylvan aspect we are confronted with row upon row of houses; the process of evolution is simple in the extreme: the speculative, and too often jerry builder, descends upon these pleasant fields; he has coveted them in his mind's eye possibly for years, and has foreseen the demand for houses of a certain class; the owner of the soil is approached, and for anything over agricultural value was, years ago, only too ready to sell or lease a few acres. Presently the house constructor—for he is seldom a regular master builder—makes his appearance with his merry men; together they soon sweep the green wood tree out of existence; countless heaps of mortar and other builders' materials dot the ground, and endless spoil heaps are the chief objects of view for some time; then gradually a terrace of the ugly little houses emerges from the ground; hall door to the right, parlour window to the left, two skeleton-sashed upper windows, and an ugly eave of projecting brick, finished with a vulgar-moulded eaves gutter. Sometimes the juxtaposition of hall door and window is counter-changed; sometimes there is a bay window, sometimes not; the changes are rung upon a frontage that is sometimes 20 feet, sometimes as little as 12 or 14 feet, while in front there is a little arid grass patch of so-called garden. The first terrace completed in "Buckingham-avenue," or "Blenheim Park"—for there are usually high-sounding names thrown in as an additional inducement

to the eager tenant—is comparatively harmless, for the opposite side of the road is unbuilt upon; and there still remains a glimpse of, perhaps, the distant Dublin mountains or a clump of old elms in the middle distance. But, by and by, this, too, disappears, for the problem is not to preserve for future generations a pleasant little vista, or an open green space to lighten the darkness of interminable and hopelessly uninteresting brick and mortar, but rather to solve how the greatest possible number of houses may be crowded in upon the ground, without regard to the legitimate claims to consideration of beauty, light, air, or even intelligent disposition. The roads are finished, the houses built on both sides, and the tenants are in occupation before the plaster has dried upon the walls. Roads, terraces, and streets, such as these, spring up around us on every side in Dublin and Belfast, and we find from time to time just one more added to the deadly monotony, and just where a few short months, or even weeks, before, we had walked amidst open fields. Now cheap houses must be built, and even speculative or jerry builders and "house constructors" are entitled to live—howsoever absurd it may seem to the architect or the man of artistic taste. Such building schemes are, as an almost invariable rule, carried through without the intermediary of an architect, and even when an architect is employed, it must be confessed, he seldom rises to the occasion, or, perhaps, it is that he is so tied down by tradition as to destroy all initiative; at all events there is little to distinguish his work from the creations of the house constructor's own brain—indeed it is when the latter is content with the simplest forms that he is least offensive; it is only when he boldly launches forth into so-called "architectural features," that he becomes positively immoral and a danger to society! Seriously, the house constructor tells us, his plan or system is the only known method by which the market can be met with the chance of a reasonable return, and that only by rigid uniformity and standardisation of materials and features, together with extreme economy—we will not say scamping—of materials, that he can put upon the market what is known as an "attractive house"—it attracts because of its newness, its kitchen on the level, the hot and cold bath, and electric bells. The people who occupy these houses are content to accept these comforts and not to trouble about æsthetic qualities, or even considerations of open air and abundant light. Now is it true that this is the only solution, or is that idea only another creation of the house constructor's brain? Could simple, pleasant little houses, with some element of artistic feeling pervading them, set each in its own little plot, for the ground is, generally speaking, fairly cheap, not be compassed: would it not be possible that such structures might be evolved at no greatly higher cost, and the ground laid out on some better principle than the covering of the last foot of earth? At all events some authority should prevail to preserve to roads wrung from the open country, the possibilities of a vista of trees and green and mountain or open space of verdant turf. What right has a man, for the sake of a very little added profit, to make hideous the whole face of a district, when a little enforced restraint on his part would preserve to the people some of the features of the country?

Our readers doubtless noticed an announcement in our last issue relating to a project for creating a garden colony outside Belfast, at the Belfast Garden Company's Estate at Cliftonville, a company, the Belfast *Evening Telegraph* tells us, of which the leading and enterprising spirit is Sir Robert McConnell, Bart., and which claims to have solved the problem of establishing a garden colony within access of a penny tramcar, and a journey of ten minutes from the heart of the town. They have provided the facilities for enabling the middle classes and the artisans of the city to become absolute owners of their own houses by the yearly payment of a sum which is practically only equivalent to the nominal rent. Further, they have achieved variety of architectural design in an extraordinary degree, so that no two houses in the colony are exactly alike, either in their external appearance or internal arrangements.

With the object of giving encouragement to the erection on their property at Cliftonville of the best arranged

and most appropriately designed houses, and the economical yet artistic furnishing of these dwellings, the company have decided to offer prizes to the value of £700, open to all who choose to comply with the conditions laid down. The competition is divided into three classes, the cost of the residences being limited to £240, £275, and £350 respectively. The intention of the organisers is to secure the most convenient and homely artistic houses that can be procured for these stipulated amounts, combined with sound workmanship, solid construction, and up-to-date sanitary arrangements and appliances. The competition is not for plans or designs on paper, but for completed houses erected on the estates, and finished throughout and ready for occupation. To assist intending competitors in realising the intentions of the company it may be stated briefly that the main points to be embodied in these buildings comprise convenient and spacious rooms, with commodious kitchens, and correspondingly good minor offices accommodation as well as convenient staircases. At the same time it is very desirable to economise space in administrative passage ways, seeing that every cubic foot of the interiors of dwellings of this class is of the utmost consequence to their usefulness. No part of the house should be deficient in light, and over-looking adjacent houses should, if possible, be avoided. Due regard to the cost of maintenance and repair should be observed. Good, substantial methods of building are essential, and the fittings, grates, and other details of equipment should be appropriate and the best of their kind. Agricultural design will by no means be considered an unimportant factor in determining the awards; though simplicity, with good proportion, will rank of greater importance than any meretricious display or florid ornamentation. Provided the houses are suitable for the middle-class occupier, no restrictions as to style will be imposed, and every facility will be afforded to competitors in the realisation of their designs, provided, of course, that the stated conditions are complied with.

For the purposes of this competition some thirty-three special sites have been laid out on one of the most attractive portions of the estate, and these sites have frontages towards broad avenues, 40 feet wide, already planted with trees. These thoroughfares will be completed by the company, at the latter's expense, in accordance with the requirements of the city surveyor for Belfast. Water, gas, and sewers are already laid ready for connection with the new houses, while several acres of land have been enclosed and laid out as a private recreation ground for the use of the residents.

Seemingly, the competition will be conducted upon really fair lines, for all houses are to be completed on or before 1st November, 1906, when Mr. Maurice B. Adams, F.R.I.B.A., the assessor, editor of our contemporary the *Building News*, and himself the author of excellent work on cottages and small houses, will proceed to make the awards, and the result will be published in the local newspapers within one week of the award being received by the Garden Estates Company. The elevations, sections, and plans of each house are to be sent to Messrs. Carson and McDowell within one month of the allotment of site, for approval, before the building may be commenced, and the company shall express its approval or disapproval of the plans within seven days from the leaving of same. If it be considered that the proposed house would in any way be injurious to the houses on the surrounding lots, the design must be amended to the satisfaction of the company, and clearly shown in a workmanlike way on the drawings to be resubmitted and approved before building operations are commenced.

Mr. Adams' appointment ensures a fair and impartial award, and it is most properly notified that his decision will be final. Full details of the competition may be obtained by reference to our advertising columns, and the stipulation has been made that all materials must be of substantial and permanent character.

The company have also adopted an arrangement, whereby the houses may be furnished for the tenants on the hire purchase system on economical principles.

A most attractive feature is the central pleasure garden, delightfully situated. Here will be a tea-house, and

summer concerts will be arranged. The Garden Colony scheme seems destined to prove a great success, as well it deserves, in Belfast, notwithstanding the over-built condition of that city. How much more so ought it not to prove in Dublin? We look forward with the greatest interest to the ultimate results of the Belfast experiments, and await its introduction into Dublin, for it seems to us the true solution of the middle-class housing problem. The company are to be congratulated, in that, instead of "botching" the effort with amateur or semi-amateur effort, they have put themselves unreservedly in the hands of an architect like Mr. Adams, who thoroughly understands what is really needed.

## COMMENTS.

### Architectural Registration.

Our contemporary, the *British Architect*, quotes from the *American Architect*, on the subject of statutory registration as follows:—

"We have so little sympathy with the 'architect's license' movement," says the *American Architect*, "that we can hardly be expected to say anything in favour of the Bill now before the New York Legislature. But it is perhaps worth while to ask its supporters whether they will quite relish the degradation of being forced each year to pay five dollars for the privilege of practising their vocation, while their neighbour on one side, a lawyer, and their neighbour on the other side, a physician, are allowed to earn their daily bread in peace and honour without being tagged—and having to pay annually for the tag—as suspicious persons? The official 'license'—obnoxious word!—framed and hung upon the architect's office wall will be but the evidence, first, that he wears the collar of a trades union, and, next, that he stands in need of police supervision."

"Our own belief is," continues our contemporary, "that the evil done by those who can now practise as architects, but who would be barred from practice through the operation of a license-law, is really a negligible quantity, so far as public safety is concerned. The practitioner of blunted moral faculties, who, for gain, becomes the willing tool of real-estate speculators, may be able to pass with flying colours the severest examination that can be devised. How does a license protect the public from such a man? For such real evil as there is—and so far as the public are concerned, it is infinitesimally small—we believe that a cure should be found, not through special and obnoxious 'class legislation'—which may or may not prove to be unconstitutional, for the constitutions of the several States are by no means identical in their provisions—but simply through enforcing against the small body of malpractitioners the penalties already established by the general laws."

Plainly, the *American Architect* is no supporter of the principle, and its argument is distinctly plausible, but it is not the general view of the professions specially cited. A barrister cannot ply his calling in Ireland until and unless the Benchers of the King's Inn are satisfied that he has, first, a good general education; next, a sound professional training acquired by attendance at lectures and by study; next, he must have a certificate signed by a practising barrister, and be proposed for a call to the bar by a bench. Formerly, he had, in addition, to serve an apprenticeship to a practising barrister; and, by the way, it is interesting to note that lawyers of observant habit, agree in declaring that the abolition of that ancient system of apprenticeship has resulted in a decided depreciation in the profound knowledge of law formerly possessed by members of the Irish bar. Solicitors have to pass a series of examinations and to serve an apprenticeship, and must be formally admitted "Solicitors of the Supreme Court" before they can practice, while, happily, for the safety of the public, entry into the ranks of the medical practitioners is safeguarded under a most elaborate system, and the methods and standards of the examining and licensing bodies are subject to the control of a general medical council, consisting of elected representatives from various bodies, and the control of the council is real and practically effective. The dentists and chemists likewise have their similar rules to conform to in respect of education and license; even stockbrokers must prove their financial position before they can go "on Change." These professions have almost, without exception,



stamped out quacks, who simply humbugged the public. Speaking to a solicitor the other day whom we found unacquainted with the freedom of the architectural profession, we found he was simply astounded when we told him that he might at once, without let or hindrance, put "C.E." after his name and call himself architect tomorrow if he chose. Even the Church, in almost all its denominations, has found itself obliged to see to and enforce the proper training of its priests and ministers, although here no financial considerations prevail, nor any element of mundane injury to the public; and the primary qualifications of ecclesiastics are, moreover, of a purely moral character. Most of the denominations which recognise men specially set apart as ministers of any kind, go further, and will not ordain men unless, in addition to theological qualifications, they possess also good general education. The fact that men of most unsuitable character might fulfil the qualifications of theological and general knowledge, does not deter them from applying tests to those who are admitted to the ministry. The architectural and engineering professions seem to stand alone.

### THE BEST MATERIALS FOR CONCRETE CHIMNEYS.

Chimney and fireplace construction has baffled the concrete builder the past few years more than any other subject, as some would give entire satisfaction and others prove failures.

By a series of practical tests the causes of this difference has been in a measure understood, although much is yet to be learned, and a report of these tests will, we hope, assist in further research.

Sulphuric acid, potash and magnesia are more or less injurious to cement products, and the first two are produced by the burning of coal and wood, while magnesia is found in some cement, but as long as the cement product is kept in a moist place, the magnesia is harmless; and as a chimney becomes very dry the magnesia has the most favourable opportunity of creating disintegration of the concrete; and sulphuric acid or potash having the same effect on concrete, these three elements soon turn concrete into dust by crumbling away. To successfully overcome this, our tests have solved much, which is verified by chimneys erected years ago and now in fine condition, which is due to the absence of magnesia. A few examples exist where a slag cement having an abundance of magnesia has withstood the endurance test, but only when crushed furnace slag was used instead of sand.

This is understood only when we realise that all slag products are acid and potash-proof, their raw materials being entirely different from that used in making Portland cement, but that the constant dampness alone prevents disintegration, yet Portland cement, made largely of furnace slag, is proof against these enemies, besides having all the qualities of a high-grade Portland cement. Of this class we have but two brands on our market, and a large number of our readers could not obtain them; besides, we have only limited time tests.

Natural gas fumes destroy concrete chimneys in less time than any of the above, and it is known that under strong usage sound concrete has disintegrated in a few weeks.

Hence, to make a concrete chimney proof against these elements we must prevent their coming in contact, which is best accomplished by applying two coats of salt and lime to the interior surfaces of the chimney, the solution consisting of equal parts of salt and lime with sufficient water to make same readily applicable with a brush.

Another feature is not to use stone for at least three months after same has been moulded, and keeping same very wet both several days previous and several days after placing.

Our tests bear us out on above, and we might add that cements burned at a high heat are preferable.

Sand cement brick made of lake sand and high-burned Portland cement became brittle, while those coated are perfectly sound.

One sand cement brick made of lake sand and Universal (slag) Portland cement remained sound without the coating, which forces us to place Portland cement made of slag among the high grades.

Brick made of low-burned cement showed some sign of crumbling, even though they had been protected by the coating mentioned above.—Fred. W. Haglock in the *American Carpenter and Builder*.

### ANSWERS TO CORRESPONDENTS.

#### Cement.

**SUBSCRIBER.**—The firm who make the cement to which you refer is Messrs. Hilton, Anderson, Brooks and Co., of 6 Upper Thames-street, London, E.C. We do not know of anyone in Dublin selling the cement, nor is there, as far as we know, any Irish agent.

#### Solid Wood Floor.

The following specification would give you a good solid floor:—The floor to be of prepared white Norway 1-inch thick, in batten widths, wrought, rebated, edges of boards to be coated with white lead, and each board to be cramped up singly till the white lead squeezes out at top. The flooring to be laid with straight joints and splayed heading joints, and each board secured by two 3-inch cut flooring brads. All nails to be punched down. The flooring to be bedded upon a layer of bituminous composition of pitch and tar,  $\frac{3}{8}$ -inch thick, in the proportion of 1cwt. of pitch to 7½ galls. or coal tar, boiled together for one hour or longer, so that when cold it may be elastic and tough; the mixture to be spread evenly over the surface of the concrete, and levelled to receive the floor boards. The boards should not be laid till the composition becomes quite cold, which means at least 5 hours. The concrete to be mixed in the following proportions:—

1 Portland cement to 4 coke-breeze. Turn over twice dry, then add water through a rose, and turn twice over twice more. The mixture must be fairly sloppy, as the breeze absorbs much water. The floor boards can be nailed directly on to the concrete, but about a month must be allowed for the latter to dry thoroughly before laying the boards, otherwise the moisture will buckle them and probably cause rot.

The dry broken brick filling underneath to be 4-inch thick, well rammed, and brought to a level surface to receive the concrete.

No kiln dried flooring to be used with these solid floors under any circumstances.

Oilcloth should not be laid down immediately on completion, as it tends to promote dry rot.

#### The Septic Tank System.

**"COUNTY SURVEYOR."**—Replying to your inquiry relating to the Septic Tank System, the arrangement for which the Septic Tank Company hold patents is the original Exeter System improved, and is the invention of Mr. Donald Cameron, formerly City Engineer of Exeter. It seems to have been the first application of bacteriological purification on a practical scale. Their system has now been in operation in various quarters of the globe for several years, including many places in Ireland, and with general success. There are now several rival patents, some of which are very effective.

We have had no personal experience of their small installations for individual houses, but from experience of their larger installations for towns and villages we see no reason why they should not prove equally effective. We have been perfectly satisfied with the results obtained by the Septic Tank Co.'s methods. Under proper conditions the effluent obtained is excellent, and may be freely discharged into a stream or river. The usual arrangement is: First, bacterial treatment in a tank; next, treatment by contact beds or filters; finally, irrigation over land. The chief advantages it possesses are simplicity and practically automatic working, while a comparatively small area of land is sufficient for the irrigation. A small town or village installation only required the attention of a labouring man for a few hours per week.

Mr. Comyn and Mr. Arthur J. Martin were associated with Mr. Cameron in the development of the patents and the working of the experiments. Mr. Cameron and Mr. Comyn are still working together, but Mr. Martin is in practice on his own account as a consulting engineer in Westminster.

### "THE FIRE ON THE HEARTH."

In our issue of the 7th ult. we mentioned that this excellent grate was stocked by Messrs. Maguire and Gatchell. We regret to find this an error. "The Fire on the Hearth" is, however, sold by Messrs. Brooks, Thomas and Co., Sackville-place; Dockrell's, Ltd., South Great George's-street; Keating and Sons, Grafton-street; and McCullagh and Nairn, Stephen's-green. Intending purchasers of grates cannot do better than consult one or other of these well-known firms, who will readily afford them any information in regard to the unquestionable merits of this grate.

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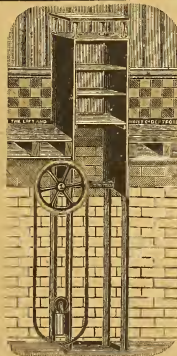
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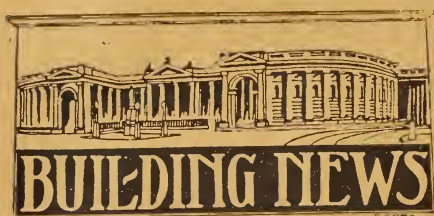
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**Ballymacash (Co. Down).**—The brethren of Ballymacash Loyal Orange Lodge 317, who have been handicapped for a number of years owing to the want of suitable accommodation to carry on the work peculiar to their Order, have secured a desirable site at Laurel Hill for a new hall, and on the 14th ult. Mrs. C. C. Craig, in presence of a large audience, gracefully performed the ceremony of laying the foundation-stone.—*Northern Whig.*

**Comber.**—THE MASONIC HALL.—The consummation of the long-cherished desires of Temple of Fame Lodge, one of the oldest, and holding an unbroken, as well as an honourable, record since its foundation, was realised last week, when the splendid new hall in Castle-street was duly dedicated to Masonic work in accordance with ancient Masonic rites by the R. W. Provincial Grand Master of Down, Br. R. G. Sharman-Crawford, D.L., assisted by R. W. Br. F. C. Crossie, M. B. Deputy P.G.M., and the members of the R. W. P.G.L. of Down. The contractor for the reconstruction work was Br. Kirker G. Walker, Jonesborough-street, Belfast, who has carried out his share of the work in an excellent manner, which remark can also be made of Mr. James Symington, who executed the plumbing work.

**Cork.**—The County Borough Council will consider proposals from persons willing to contract for paving with compressed asphalt the carriage-way of Winthrop-street, in accordance with the specification and conditions of contract, to be seen in the City Engineer's office, Municipal Buildings. Tenders to be lodged on 11th May, 1906.

**Dublin.**—Messrs. Hely, Ltd., of Dame-street, contemplate adding to their premises. The architects are Messrs. Batchelor and Hicks, Merion-square, Dublin, and the contractors Messrs. Thompson, of Belfast and Dublin.

The important licensed premises situate at the corner of North Circular-road and Glasnevin-road, opposite "Dunphy's," are being rebuilt from the designs of Mr. George L. O'Connor, Dublin.

The new premises of the Irish Automobile Club in Dawson-street were formally opened by His Excellency the Lord Lieutenant. An inspection of the new premises was made. The immense advantages of the new entrance in Dawson street, opening, as it does, opposite the Mansion House, and giving access by private doors to some of the clubs in Stephen's-green, were pointed out and contrasted with the former highly inconvenient entrance at the rear, through Ann's-lane, on which the club has had to depend hitherto. Both entrances can now be used if necessary, as the levels are practically the same throughout. The premises are equipped with a turning table, an ingenious arrangement, supplied by Messrs. M'Gloughlin, Great Brunswick-street, and accommodation is provided for 100 cars, but there is plenty of additional space available if required at any time. This is a contingency not unlikely to occur, as the present membership numbers 300, and is increasing almost daily. A sum of £3,000 has been spent in equipping the premises, and internally they are fitted up in a manner that reflects much credit on the club. Messrs. M'Gloughlin and Harvey, Dartmouth-road, carried out the contract in accordance with the plans of Messrs. Batchelor and Hicks, architects, and the electric fittings were supplied by Messrs. Shuley and Bayfield.

The Local Government Board for Ireland propose to make a Provisional Order, the purport of which is to enable the Corporation of Dublin to put in force the compulsory powers of the Land Clauses Acts, amended by Section 8 of the Public Health (Ireland) Act, 1896, with reference to certain lands at Fairview, Clontarf, required by the Corporation for the purpose of providing a place for the deposit of any matters collected by them, in pursuance of Part II. of the Public Health (Ireland) Act, 1878, and of laying out, planting, improving, and maintaining a recreation ground. The Order will contain clauses for the protection of the Dublin Port and Docks Board, and for saving the rights of the Crown.

**Dunacloyne (Co. Down).**—On morning of 14th instant one of the most disastrous as well as one of the fiercest fires that have ever occurred in the district took place at Dunacloyne House, some five miles distant from Lurgan, and resulted in the complete destruction of one of the finest residential man-

sions in the North of Ireland, the property of Mr. Abram Combe, of the great engineering firm of Messrs. Combe, Fairbairn, Lawson, and Combe, Leeds and Belfast. The outbreak was discovered about ten o'clock in the morning by one of the maid-servants, and apparently originated in the portion of the house known as the menservants' mess, though the origin is still unknown.—*Northern Whig*, Belfast, 21st.

**Kingstown.**—The Urban District Council have received tenders for the erection of the buildings in connection with the proposed refuse destructor at Municipal Yard, Kelly's avenue.

**Leamore (Tullamore).**—Tenders are invited for the erection of a dwellinghouse for Mr. Joseph Devery, at Leamore. Plans and specifications may be seen at the office of A. V. Ashe, Esq., A.M.I.C.E.I., Tullamore.

**Londonderry.**—Tenders will be received to-day (Saturday, 5th May) for sundry repairs to Y.M.C. Association Buildings. Specification of work can be seen at the office of T. Johnston, Esq., architect, 11 East Wall, Londonderry.

**Mallow.**—An inquiry under the Labourers Acts concluded at Mallow before Mr. Barnewall Crofton, Inspector, Local Government Board. There have been 276 cottages already built by the Rural District Council, and these are let at rents ranging from 10d per week to 1s 2d, according to the size of the allotment. It appeared that the rents are so well paid that out of a total rental of £800 a year, only £4 remained due at the end of the last half-year. The Inspector, in the course of the inquiry, congratulated the Council and the labourers on the result of their combined efforts. The present scheme proposes the erection of 147 additional cottages. There was very strong opposition by the tenants of the lands in many cases, especially where the holdings had been purchased under the Land Acts, but in no case did the owners appear to oppose.

**Newry.**—The No. 2 Rural District Council invite tenders for the building of nine labourers' cottages, in seven single houses and one double house block. Tenders before the 15th May.

**Portrane.**—The Joint Committee of the Richmond District Lunatic Asylum have made application to the Local Government Board for Ireland for their sanction to borrowing certain moneys, amounting to about £2,000, required to defray expenditure in connection with a special award, and arbitration fees and legal expenses in respect of contracts for the execution of works at the Portrane Asylum. The Local Government Board deem it expedient, before sanctioning such borrowing, to cause an inquiry to be made in relation thereto. The Local Government Board have directed their Chief Engineering Inspector, P. C. Cowan, Esq., M.Inst.C.E., to hold a local inquiry in the matter, and to report to them thereon, and P. C. Cowan will attend at the Boardroom of the Richmond District Asylum at 11 o'clock a.m. on Monday, the 7th day of May, 1906, for the purpose of holding such inquiry.

**Rasharkin (Co. Antrim).**—On the 16th ult. the ceremony of laying the foundation-stone of a new Orange hall at Rasharkin was gracefully performed by Mrs. Moore, wife of Mr. William Moore, D.L., K.C., before a large assemblage of Orangemen belonging to the Ballymoney and Ballymena districts. Some short time ago a building fund was started by Rasharkin Purple Heroes Lodge 950 and Rasharkin Chosen Few Lodge 694. The loyal brethren found this necessary, the halls at Granagh and Lisnagaver, where these lodges met respectively, having been taken possession of by the "Independents" after the split. The contractor for the building is Mr. John Reid.—*Northern Whig*.

**Tallaght.**—The Dublin County Council received tenders for the building of a boundary wall and laying out the grounds round the new Court of Petty Sessions at Tallaght.

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# ENGINEERING SECTION.

## ITEMS.

The Kinsale Union does not seem to have been very successful with its recent septic tank installation. At a recent meeting under the presidency of Mr. H. T. Daunt, J.P., chairman, the subject was under discussion, and we learn that the tank, which was erected at a cost of £700, has turned out a complete failure, and is, as some of the members remarked, "a standing monument for future generations." The question of expending a further sum of £146 on the improvement of the tank was considered, but the general feeling was that the results might be inadequate to abate the existing nuisance. It was thereupon decided to connect the septic tank, by means of a drain, with an existing main sewer at a cost of £300, and so settle the difficulty for all time. Under such a scheme the tank will apparently become an enlarged inspection chamber, and it is probable that the inhabitants of the locality will wonder where is the value for an initial expenditure of £700. It is unusual to hear of such an utter failure in this system of sewage disposal, and we hope shortly to be in a position to give our readers more information on the subject.

The recent calamity at San Francisco affords further sudden and most convincing evidence how Nature dominates the highest achievements of man, and how in one moment the finest efforts of the human race can be overthrown. The engineer may bridge the torrent, tunnel the mountain, and connect the continents, and, standing afar off, may contemplate his work, proudly meditating on the natural obstacles his mind and dogged perseverance have overcome. But let Nature bestir herself for a moment and her efforts take a proper proportion, his labours are undone, and a city of a population equal to that of Dublin is laid in ruins. Fortunately the inner consciousness of man rises superior to the trials of such sudden catastrophes, and it is a tribute to the advance of civilising influence that undaunted, even if humbled, the American citizens are already turning their thoughts to the future and to the new western capital which is to far outshine the glories of the old. The whole world, moved by the magnitude of the disaster, rushed to aid the sufferers, but the President in his wisdom has thought fit to decline it. We shall therefore have the spectacle of the American nation, unassisted, hastening to wipe out the traces of the *dies ira*, a spectacle which must command a universal sympathy and admiration.

A proof of the absolute necessity to carefully supervise the composition and proportions of the material used in ferro-concrete construction is to be found in the latest report of the Public Works Department of Egypt. According to Mr. Ehrlick, the cattle guaranteed open sheds at Mex were built entirely of reinforced concrete, the distance from the sea being some 65 feet, and the buildings were subject to exceptional climatic variations. The roofs were found to be failing, and the special commission which was appointed to report on the matter discovered that proper care had not been taken in the mixing of the concrete. This material was neither air-tight nor water-tight, and it was quickly and conclusively proved that the employment of a local non-silicious limestone had to a great extent assisted in the destruction of the roofs by adulterating and replacing in part the cement, which is the chief guarantee of impermeability. This mode of construction is receiving much attention at present, and young practitioners are tempted to adopt it in order to experiment with or to show they are conversant with the most modern scientific methods. Undoubtedly reinforced concrete has many initial advantages: it is economical, durable, and fire-resisting, and the tension rods supply a deficiency which has ever been detrimental to the employment of ordinary concrete. But we cannot refrain from repeating the warning that this comparatively new material must be carefully handled, and at the present stage of our knowledge of its behaviour and want of data, it behoves engineers to exercise the greatest caution in designing buildings in which ferro-concrete plays a conspicuous part. With concrete properly prepared both with regard to selection and incorporation of materials there is little doubt that ferro-concrete has come to stay, but, as the report above referred to indicates, any lack of supervision and comparatively careless handling will assuredly lead to regrettable and possibly disastrous results.

In an interview we had recently with Mr. Delaney, the Cork City Engineer, who is one of the secretaries of the Architectural and Engineering Section of the forthcoming Congress of Public Health in that city, we learnt with regret that the section is not meeting with the amount of support to which it is entitled. Circulars have been issued broadcast throughout Ireland by him and his co-secretary, Mr. A. Hill, inviting architects and engineers to co-operate in making their professional section a success, but so far the results have been meagre in the extreme. The Architectural Association of Ireland has appointed a delegate to attend, and the Royal Institute of Irish Architects has appointed the President, Mr. W. M. Mitchell, to represent that body, but the Institution of Civil Engineers is not taking up the question very keenly. It would be a standing disgrace to both professions in this country if the section could not be formed, and such a result would be a serious disappointment to the hon. secretaries after their indefatigable exertions. The time is becoming short for steps to be taken, as the Congress will meet in June, and we under-tan<sup>d</sup> that the Reception Committee has its arrangements well advanced. Delegates may be sure of receiving the traditional welcome from the hospitable Southern capital.

The annual general meeting of the Institution of Civil Engineers was held on Tuesday, April 24th, with the President, Sir Alexander Binnie, in the chair. The result of the ballot for the election of officers was declared as follows:—President, Sir Alexander B. W. Kennedy, LL.D., F.R.S.; vice-presidents, Mr. W. R. Galbraith, Mr. W. Matthews, C.M.G.; Sir E. Leader Williams, and Mr. J. C. Inglis; other members of Council—Lieut.-Col. W. P. Anderson (Ottawa, Canada), Mr. B. Hall Blyth (Edinburgh), Mr. John Benton, C.I.E. (India), Mr. C. A. Brereton, Mr. R. Elliot-Cooper, Col. R. E. B. Crompton, C.B.; Mr. Joseph Davis (Sydney, N.S.W.), Dr. G. F. Deacon, Dr. Francis Elgar, F.R.S.; Mr. M. Fitzmaurice, C.M.G.; Mr. R. A. Haddfield (Sheffield), Mr. G. H. Hill, Mr. Walter Hunter, Mr. I. H. Johns (Johannesburg), Mr. G. R. Jebb (Birmingham), Sir William T. Lewes, Bart (Aberdare), Sir George Livesey, Mr. A. G. Lyster (Liverpool), Sir Andrew Noble, Bart., K.C.B. (Newcastle-on-Tyne), the Hon. C. A. Parsons, C.B., F.R.S. (Wyham-on-Tyne), Mr. A. Ross, Mr. A. Siemens, Mr. J. Strain (Glasgow), Sir John Thornycroft, LL.D., F.R.S.; Professor W. C. Unwin, B.Sc., F.R.S.; and Mr. A. F. Yarrow. Engineers will at once recognise in the above list what a strong and representative Council has been elected.

We have before us the new rules and syllabus of examinations, applying to the election of associate members of the Institution of Civil Engineers of Ireland. They are the result of the recent regulations of the Council, and the Engineers of Ireland are to be congratulated that their professional affairs are in the hands of such a capable and energetic body. Except under certain circumstances, it has been decided that no person can be elected as an associate member without previously passing the examination, which will be held annually in Dublin in June, with an entrance fee of one guinea, but it should be added that certain University degrees are recognised by the Council as proving a sufficient standard of attainment in the requisite subjects. At present these consist of the B.Sc. (Engineering) of the Universities of London, St. Andrews, Glasgow, Edinburgh, Manchester, Leeds, Birmingham, Wales, and Montreal; the B.A. (Mechanical Sciences Tripos) of Cambridge University, the B.A.I. of Dublin University, the B.E. and M.E. of the Royal University of Ireland, and Assoc. in Engineering of the Royal College of Science, Ireland. The B.Eng. of the Liverpool University is also included, provided the degree be obtained by passing the University examinations. The syllabus is divided into four, viz.:—(1) Applied Mechanics, subdivided into Statics, Hydrostatics, Kinematics of Plane Motion and Kinetics of Plane Motion; (2) Strength and Elasticity of Materials and Theory of Structures; (3) Heat Engines and Electricity; (4) General Engineering. It will therefore be seen what excellent ground the new examination scheme covers, and it is to be hoped that the labours of the Council will meet with merited reward, by the examination next June being successful, both in the number of candidates and in the standard of answering. There is no doubt that this new departure on the part of the Institution will be watched with keen interest by the engineering pro-



fession throughout Ireland, and it may be surmised that the result will be a considerable strengthening of an already powerful body, both in point of numbers and in influence. With this programme before us we cannot help comparing the labours of the Institution of the Civil Engineers of Ireland with the want of policy which is exhibited by the kindred Institute of Architects of Ireland. It is but two years ago that the younger members of the architectural profession approached their Institute on the subject of examinations, as they recognised how essential it was to improve the professional training of architects in this country, and considered examinations to be a means to this end. But the Council of the R.I.A.I. could not face such a responsibility, and although by sheer force of numbers the younger members carried their point, no steps were taken to give practical effect to their wishes, or even to ascertain if such were possible. "As it was, is now, and ever shall be" might with much appropriateness be carved over the portals of 20 Lincoln-place, and under such depressing circumstances it is scarcely likely that the object-lesson afforded the R.I.A.I. by the Institution of Civil Engineers of Ireland under identical circumstances will awaken the former body to a sense of the reason of its existence.

The deputation of the Irish Forestry Society which recently waited on the Chief Secretary for Ireland received, as would naturally be expected, a sympathetic reply. The question is one of such national importance that the Society is to be congratulated on its endeavours to keep the matter under public notice. The suggestions made were that a timber bureau should be established, and that a general scheme of replanting should be initiated throughout the country on lands adapted for the purpose, especially of Douglas fir. The result of the deputation was satisfactory as far as it went, but Mr. Bryce stated at the conclusion of his remarks that it would be desirable to know if the Irish climate was favourable to the growth of large timber, and he felt that what was really wanted was positive, scientific and definite information on the subject before it could be expected that the Government would enter into any policy. This is only a natural demand, and it may confidently be anticipated that the Society will quickly place the Chief Secretary in full knowledge of the data he requires.

How closely engineering and architecture are allied is evinced in the underpinning work which is in hand at Winchester Cathedral. For some months past, most alarming reports have been circulated as to the condition of the building, especially with regard to the eastern end, the Retro Choir and the Lady Chapel, where serious settlements have occurred. These subsidences are to be attributed to a failure of the foundations, which were built in 10 feet of waterlogged ground upon a longitudinal layer of logs. Curiously enough, at a further depth of 6ft. there is a firm bed of gravel, which apparently escaped the attention of the mediæval builders, and to which it is now intended to carry down the foundations. The work involved is of a very difficult and delicate nature, and will have to be executed by divers, as the water under the building often rises to a height of ten feet above the firm substratum. Upon the gravel will be laid a course of bags of concrete to a depth of two feet, and on this will be formed a layer of concrete to a depth of 2 feet, from which the actual underpinning will spring. It is estimated that the cost of the work will be £30,000, and that it will take three years to complete. It is considered highly probable that, had the shoring been delayed for a month or two longer, the whole of the eastern end would have collapsed.

#### DEEPENING THE COLOUR OF MAHOGANY OR OAK.

Many woods, especially oak and mahogany, become beautiful by simply deepening their natural tone. Age will give them this deeper tone, but it is not possible for us to wait fifty or a hundred years for mahogany to assume the deep rich red tones so much admired in old furniture, and we must therefore resort to artificial methods of ageing these woods. For this purpose acid and alkali stains are particularly well adapted. The oldest stain of this kind used, and one of the best, is lime water, or the milk of lime made by slacking ordinary lime in a sufficient quantity of water. This is brushed over the surface of the wood and allowed to dry, and then the lime is brushed off. If the stain is not deep enough the process is repeated one or more times. The wood is then thoroughly washed and then sponged over with vinegar to neutralise any traces of alkali that might remain, and which would injure the subsequent varnish coats. The greatest objection to the use of lime is that it is slow. Ammonia, reduced with water to the proper strength, is much quicker than lime.

#### FERRO-CONCRETE IN TIDAL WATERS.

There is probably no purpose for which reinforced or ferro-concrete is more suitable than for the construction of piles. Especially is this the case where the latter are to be used in marine engineering works, because it is a well-known fact that timber exposed to the action of sea or tidal waters suffers very much from attack by the *teredo navalis*, a species of mollusc which bores into timber. The ravage of this little animal has cost the British Government many thousands of pounds, and Holland has been more than once threatened with destruction from the attacks made by the *teredo* on the wooden piles which support the mounds and dykes of that kingdom. The only wood which seems to be able to resist this destructive agency is Tasmanian Blue Gum. Masonry, of course, and ordinary concrete are suitable for dock and harbour work, though it is frequently the case that massive walls built upon alluvial soil are liable to settlement, with disastrous consequences. But for wharves, jetties, landing stages, and kindred forms of construction, concrete and stone are obviously unsuitable, and for these purposes timber piles and framework have been almost universally employed until the superiority of reinforced concrete has come to be fully recognised by engineers.

Among the advantages—over and above its practical indestructibility—offered by ferro-concrete for marine piling the following are worthy of note. The piles can be moulded to any required length and section, and can be driven as continuous or sheet piling to practically any depth. As sheet piling, ferro-concrete forms a perfectly water-tight barrier without a single horizontal joint. The barrier thus formed can be proportioned so as to resist any required pressure, and owing to its being firmly rooted into the substrata no subsequent movement need be feared. Although the use of reinforced concrete for piling purposes is comparatively recent in these countries, it has been largely adopted, and examples of this form of construction are now to be found on all parts of the coast and in many navigable channels of the United Kingdom. We append a few examples, all of which are under construction at the present time. For the Admiralty two jetties are being built at Haskar, near Portsmouth, and two similar jetties for torpedo destroyers at Portland. On the Thames several works are in progress both for the City Corporation and for private firms. In the Isle of Wight a jetty is being built at Cowes for a steampacket company. At Newcastle-on-Tyne there is another important jetty, and in Plymouth Harbour the Great Western Railway are constructing a landing-stage for goods traffic. In Scotland the Caledon Jetty, Dundee, is in course of construction from the designs of the Harbour Engineer. Coming to Ireland, we find the following works in progress:—A breakwater at Passage East in Waterford Harbour by the Public Works Department; at Waterford a jetty is being built for Messrs. J. and R. Hall (who have also had a huge warehouse erected of ferro-concrete); and in the same county the G.S. and W.R. are constructing a viaduct of some magnitude in and parallel with one bank of the River Suir. This viaduct was designed by Mr. Alber Gordon, M.I.C.E., to carry a diversion of the public highway rendered necessary by extensions of the railway system. All the foregoing works are being executed in accordance with the Hennebique System, one of the best known and most reliable of the armoured concrete methods of construction.

The fact that so many works are in progress at the present time is a striking proof of the extent to which reinforced concrete is being adopted in marine and other engineering works. The immense powers of resistance of this most modern building system have been dramatically demonstrated in the recent San Francisco calamity, where the steel-framed ferro-concrete buildings withstood the ravages of fire and earthquake. This will undoubtedly give a tremendous fillip to armoured cement-work which, in another way, also will be helped by the destruction of the great western city. Owing to the enormous quantity of timber that will be required in the rebuilding, wood goods, but particularly pitch pine—at present very dear—are certain to advance in value. A large contractor has stated that ferro-concrete piles can even now be made at less money than is being asked for pitch pine piling timber, and we learn that already extensive enquiries are in the market for cement. It is quite evident, therefore, that the use of ferro-concrete for the manufacture of piles is not only a fully tried and well-established practice, but that it is destined in the future to receive even greater attention from engineers and contractors in all countries.

## REVIEWS OF CATALOGUES.

**The Acme Ventilating and Heating Company** submit illustrated lists of their ventilating, heating, and drying specialties, which are thoroughly up-to-date and suitable for every condition and circumstance. This company has had over thirty years' experience in heating and in ventilation (mechanical and automatic) in every class of building, and their "Acme" systems of warming public or private buildings embody all the most modern improvements. They make a speciality of fans driven by steam and electricity, and also by spring arrangement where power is not available. Full particulars and estimates for ventilating or heating can be had on application to the company, whose head offices are at 35 Tatterton-street, Liverpool.

**Lifting and Haulage Machinery.**—A comprehensive catalogue of appliances and accessories necessary for the working of lifts, elevators, etc., is issued by Messrs. W. J. Furse and Co., Traffic-street, Queen's Walk, Nottingham, electrical engineers and contractors. Messrs. Furse have for some years devoted considerable time and money to the perfecting of electric lifts, with the result that they are in a position to offer a highly specialised and perfected machine. Full descriptions and illustrations of the various electric lifts, lift enclosures, gates and motors are given, as well as of belt-driven lifts, hand-power lifts, and dinner lifts, etc. There are also illustrated haulage gears, hoists, winches, and overhead travellers. In all of these departments Messrs. Furse are experts, being contractors to the War Office and other Government departments, to several of the largest railway companies and the leading Corporations. Their work is well known, and they guarantee efficiency.

**Messrs. Recorders, Limited,** 171 Queen Victoria-street, London, E.C., enclose us a pamphlet explaining and illustrating their patent time-recording systems. These are designed in a variety of ways to suit various purposes and the requirements of different trades. But an essential feature of all of them is the Rochester Card Recorder, a combined clock and machine which has come very largely into use in manufactories and workshops in this country. For simple timekeeping purposes the Rochester system consists of a recorder and two racks, one marked "Out" and the other "In." A card is provided for each workman, bearing his name, number, and the date. These cards are placed in numbered pockets in the "Out" rack at the commencement of the week. Each man, on entering, takes his card from the "Out" rack, drops it into the card receiver of the recorder, and pulls down the printing lever; this prints the exact hour and minute, as well as the day of the week, in the proper space and column; he then places it in the "In" rack and passes on to his work. The same thing takes place each time he enters or leaves the workshop. In this way the system shows the time for one person for one week on one card, each workman printing his own time for the week. Modifications of the system enable it to be applied as a reliable adjunct to cost-keeping and other purposes in which time-recording is an important feature.

**Anaglypta and Salamander.**—The Wall Paper Manufacturers, Limited (Anaglypta Branch) send us one of their complete catalogues illustrating the high relief designs of Anaglypta and Salamander decorations. The catalogue itself is a splendid piece of work from the mere point of view of high-class printing, the reproductions in every case being excellently done so as to convey an accurate impression of the decorations they represent. As to the designs, we can only say of them that they are without exception striking and chaste, and in the vast majority of cases highly artistic. An exquisite variety of high relief panel and other dados are illustrated, and also various elaborate designs for ceilings which, as shown by drawings, sketch plans, etc., may be made to fit any sized ceiling. A number of illustrations is devoted to exemplifying methods of combining the various designs in ceiling treatment, and the building up of dados, door and other panels. There is also a lengthy chapter allotted to general remarks and instructions in which are given directions as to fixing and practical hints on the decorative treatment of the Anaglypta based on the company's own experience. Anaglypta and Salamander (which differs from the former in being fireproof) are, of course, very well known to decorators, and are highly appreciated by architects and others on account of the fine effects that can be got by their use. The 1906 catalogue will be found of the highest interest, and should be in the hands of all connected either directly or indirectly with decorative work. From samples which we have before us we may say that the illustrations adequately convey the actual appearance of the materials themselves.

**Messrs. John Bolding and Sons, Limited,** Grosvenor Works, Davies-street, London, W., forward their supplementary catalogue of sanitary appliances. These, which are all high class both as regards design and finish, include a variety of pedestal and valve closets, sloop receivers, cisterns, lavatories, and an excellent range of baths and bathroom appliances. The baths are of all varieties, and are catalogued at a wide range of prices. Other articles illustrated are fresh-air inlets, traps, manhole covers, and other sanitary goods.

**Messrs. Morrison, Ingram and Co., Ltd.,** Hygieia Works, Haddfield-street, Cornbrook, Manchester, send us a circular dealing with their new "Densitas" ware. This is a hard, non-porous ware which is made into water-closets, lavatories, cisterns, sinks, etc., and is finished in pale buff glaze and white glaze. It is claimed by the makers that "Densitas" ware possesses three and a-half times the strength of fireclay, a laboratory test made at the Whitworth Engineering Laboratory, Owen's College, Manchester, last September showing that the breaking strain per square inch of this ware was 1,184 lbs., that of fireclay being 330 lbs. Articles made of "Densitas" are produced in two thicknesses, the ordinary thickness of such goods and double thickness representing the thickness of fireclay. "Densitas" ware is, we understand, no dearer than the best fireclay.

**"Jarrah Fencing"** is the title of a neat little illustrated catalogue and price list issued by Messrs. Millars, Karri and Jarrah Company (1902), Limited, 72 Bishopsgate-street Within, London, E.C. The advantages of Karri and Jarrah (West Australian hardwoods) for fencing purposes, in place of other woods, as regards strength, durability, and appearance, are well worth the attention of architects, landowners, builders and others. This fencing has now been adopted by several of the leading English Railway Companies, as well as by Corporations and other bodies, instead of oak. Karri and Jarrah, which closely resemble each other, are, when cut, of a fine reddish colour. If oiled and varnished they are practically indistinguishable from unfired mahogany, and they are capable of taking a beautiful polish. We have seen them used for hand-rails and newels, for both of which purposes they are eminently suitable, particularly as they are not liable to warp, and are very hard and durable. For fencing the wood is an ideal one, being clear of knots and supplied free from heart and sap. It is impervious to moisture, and requires neither paint nor creosote for its preservation. Samples of Karri and Jarrah have, in fact, been found in a perfect state of preservation after lying in marshy ground for over sixty years. The breaking strain is superior to all other woods, being nearly 50 per cent. greater than English oak, and equally superior as regards resistance to crushing. The wood is, moreover, practically non-flammable. As a result of this great strength, fencing can be constructed to a light specification, thereby reducing the cost, but at the same time conforming to the strength required. When left untreated, the timber weathers to the same degree of greyness as oak. Owing to their interlaced grain Karri and Jarrah cannot be cleft. All pales are therefore sawn, and thus present an even surface. In the catalogue several illustrations are given of plain and ornamental fencing and of carriage, entrance, and other gates, some of the designs being particularly handsome. Estimates and full information can be obtained from the company at the above address.

## OUR ILLUSTRATIONS.

**The Parochial House, New Ross.**

This house, which we illustrate, and the erection of which has just commenced, is intended as a residence for the parish priest and four other clergymen. The object in view has been to provide a large number of rooms of good size at a moderate cost. The house is really two houses—one for the parish priest and one for the curates. In the former portion the accommodation comprises a large dining room 20ft. long, a reception room, and two private rooms for each curate, together with a good hall and the usual offices. In the parish priest's house the accommodation comprises dining room, reception room for visitors, library, and bedrooms, all in addition to the usual offices.

The materials are rubble masonry, pebble dashed, with local granite dressings in piers, mullions, etc. The contract price is £3,300, which includes the extra cost of the granite dressings and similar works.

The architects are Messrs. Butler and Donnelly, of Dublin, and the contractor Mr. Andrew Cullen, New Ross.



### MESSRS. SMITH & PEARSON'S IRONWORKS. A Flourishing Dublin Industry.

The firm of Messrs. Smith and Pearson, Ltd., has now been established in Dublin since 1902. In that year Mr. John B. Pearson, who for more than twenty years had acted as Irish manager for the old and widely known firm of Messrs. Hill and Smith, Briery Hill, Staffordshire, resigned his position with that firm in order to start in business in Ireland on his own account. During his long connection with Messrs. Hill and Smith, Mr. Pearson had, of course, acquired vast experience in agricultural and builders' ironwork, and he was, therefore, particularly well fitted to inaugurate and carry on a genuine Irish enterprise in the industry with which he had been so long connected. He had also gained such a wide business connection in this country that his old employers, having learned of his intentions, very generously arranged to sell him their Irish business on favourable terms. Mr. Pearson is therefore the head of the new firm of Smith and Pearson, Ltd., which was founded with the object of making at home everything they require, and which has since worked strenuously in that direction. In this laudable enterprise Mr. Pearson is assisted by two of his sons, each of whom has had a practical training, and by an experienced staff of salesmen and clerks. By the beginning of 1905 Messrs. Smith and Pearson were in a position to announce that they had acquired an extensive piece of land on the Ossory and West roads, North Strand, Dublin, upon which they had built commodious warehouses, and they intimated that it was their intention during the year to erect machine shops, smiths' shops, and fitting, and erecting shops wherein to manufacture their specialities, instead of importing, as formerly, across the Channel.

The works are situated close to Newcomen Bridge, on the North Strand, and in close proximity to the network of railways which converge near that point. The site—a very large one—is, in fact, bounded on all four sides by railways, comprising the Great Northern main line and the Great Southern and Midland North Wall branches. The works are thus most favourably placed as regards the putting of manufactured goods on rail for any part of the country, and they are also within easy reach of the different cross-Channel steamers, so that both for the receipt of raw material and the despatch of the firm's various manufactured specialities a more likely situation could hardly have been chosen. Two sides of the ground are covered with buildings, constituting the storerooms and various manufacturing shops, through all of which our representative was conducted by Mr. Pearson himself.

The stores, covering a large area, are divided into various sections. In one a very large stock of galvanised corrugated roofing sheets is carried. These sheets are of two qualities—the ordinary and Board of Works qualities, the latter being of superior grade, both as regards gauge and galvanising. When received into the store they are carefully examined for defects, and if they pass inspection are stored in racks, ready to be sent out with the shed framing. Here also are kept complete assortments of the various bolts, clips, and other accessories necessary for the erection of shedding. In another section are long lines of racks, containing hay and cattle shed framing, such as rafters, purlins, girders, and struts, ready for despatch at short notice. These various parts are made in the works in large lots to standard gauges, and so systematically are they arranged that in the busy season Messrs. Smith and Pearson are enabled to despatch as many as eighteen sheds a week. The firm is, we are glad to say, experiencing an ever-increasing demand for these sheds, and are finding many old customers very enthusiastic in showing their interest in the effort to give employment to local labour by entrusting the new firm with work, on the understanding that it is done at home. Still another portion of the store holds gates and fencing, in which Messrs. Smith and Pearson do a large trade. As an instance, we may mention that at the time of our visit nine miles of wire fencing, with the necessary gates, etc., were being made for an Irish nobleman's estate.

Having passed through the stores, access is gained to the large smithy, containing along one wall a line of forges. At each of these, at the time of our visit, a smith and his helper were working in the traditional fashion associated with the brawny blacksmith. A great variety of work may be being turned out in this department, amongst which may be mentioned a fancy railing of artistic wrought work for the new Roman Catholic Church at Donabate, the fencing already alluded to for the nobleman's estate, and also railing for the new Ringsend Park. For the latter job the firm has put up a special tool, with foot-power anvil attached, for facilitating the smith work. Other large power tools are also installed in this department, comprising amongst others the following:—Punching and shearing machines of various sizes, a curving and straightening tool,

a circular saw for cutting joists, etc., and a number of the smaller tools necessary for the firm's business. Nothing is more wonderful in the eyes of the ordinary citizen than to see the way in which these huge machines deal with iron—cutting, bending, or punching beams and sheets of steel with the same apparent ease as a scissors gets through paper. Owing to the special plant installed Messrs. Smith and Pearson are particularly well placed for dealing with builders' structural work. Not only do they carry a large stock of rolled joists, angle and T iron, etc., but they have facilities for cutting all of these to various lengths, and preparing them for fixing in a way that enables them to handle any order for iron structures.

The erecting shops are also admirably equipped with the requisite plant, and give employment to a host of busy and skilful workers. In this department there is at present being prepared a line of steel sashes and casements for Dublin jobs. The making of these last-named goods is a new venture on the part of the firm, and judging by the quality of the work shown to our representative it is likely to be as successful as the other branches to which Mr. Pearson has hitherto devoted his attention.

Owing to the steady increase in business Mr. Pearson is already projecting the erection of further workshops and warehouses on the site, there being ample room at his disposal for these purposes without interfering with the space occupied by sample hay sheds, cattle and sheep enclosures, troughs, etc., which have been put up for customers' inspection.

Messrs. Smith and Pearson, needless to say, employ a large staff of workmen, in whose welfare, apart from their actual work, they take a great interest, encouraging them, for instance, to employ their leisure time in healthy outdoor games, such as football, there being a football club attached to the works. For the erection of their various manufactures they have a staff of outdoor foremen, all excellent workmen, and reliable in every way, most of them having worked under Mr. Pearson for many years, so that they know exactly what is required of them by the clients of the firm.

It is a genuine pleasure to be able to speak in high terms of a home industry such as that under notice where ironwork is manufactured equal in every respect to that turned out in England or Scotland. That it is deserving of support goes without saying, and one can only hope that in other branches of manufacture the example set by Messrs. Smith and Pearson will be more widely followed. Many of the manufactured goods imported into this country from England and elsewhere could easily be produced at home. The capital is not wanting, and given but a modicum of energy and initiative on the part of some of our business men we are confident that several flourishing industries could be established in our midst. In conclusion, it is only necessary to add that Messrs. Smith and Pearson's office address is 47 Dawson-street, Dublin.

### TUCK AND CO., LIMITED.

In our notice of the Spring Show we overlooked the exhibit of Messrs. Tuck and Co., Ltd., of Lower Abbey-street, Dublin, who occupied their usual position in the "Machinery Paddock." They had an extremely comprehensive exhibit, appealing very forcibly to engineers, both land and marine, millwrights, smiths, estate owners and agents, threshing managers, saw mill proprietors, millers, and creamery machine owners. Want of space prevents a detailed description of their stand being given, but it may be briefly summarised under the title of the firm as "Engineers' Providers," the exhibits ranging from petrol motors, saw benches and wood-working machinery generally, milling plant and machine tools, down to the smallest requirements of those mentioned above. As actual manufacturers of every description, in asbestos, rubber, and leather goods of these, as well as their "Tucksona" beltings and hose, and "Tucksolin" oils. They have also compiled a special "Show List" of some valuable second-hand machinery, being the contents of modern fitting and smiths' shops, offered at reduced prices, which will be sent post free to applicants.

The late Mr. W. Prime Marshall, M.I.C.E., of Birmingham, has left property to the value of nearly £28,000.

"A History of Architecture on the Comparative Method," by Professor Banister Fletcher and Banister F. Fletcher, is to be translated into Russian by M. Robert Boker, of St. Petersburg, to whom the Russian rights of translation have been sold. This is a somewhat unique thing to happen to an English text-book, and shows the extreme popularity of the comparative methods adopted by the authors.

FERRO-CONCRETE CONSTRUCTION.

As an indication of the favourable manner in which reinforced concrete construction is now regarded by public authorities, civil engineers, architects, and business firms, we give below a summary of some contracts which have been settled during the month ending April 15th last in accordance with the well-known Hennebique system, for which Mr. L. G. Mouchel, M.Soc.C.E.E. (France) is the agent-general in the United Kingdom:—

Bridges.—Firgrove Bridge, Rochdale:—Span, 26 ft. Engineer: S. Sydney Platt, M.Inst. C.E., Borough Engineer. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds. Middleton, Yorkshire.—River covering at Bridge Mills. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds.

Road Construction.—Saltley road widening, Birmingham. Engineer: John Price, M.Inst. C.E., City Engineer. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds.

Quays and Jetties.—Cullercoats, Newcastle-on-Tyne.—River Quay Wall. Caledon Jetty, Dundee. Engineer: J. Thompson, M.Inst. C.E. Contractors: Joseph Howe and Co., West Hartlepool. Woolmer Forest.—Ferro-Concrete Piling. Contractor: Fred Grace, Southampton.

Reservoirs.—Nuneaton.—500,000 gallon Covered Service Reservoir. Engineer: F. Cook, C.E. Contractors: The Liverpool Hennebique Ferro-Concrete Contracting Co.

Building Construction.—Chocolate Factory, York.—Complete factory buildings for Messrs. Rowntree and Co. Architect: W. H. Brown, York. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds. Buildings for the Associated Portland Cement Manufacturers. Architect: H. O. Cresswell, F.R.I.B.A., London. Contractors: Holloway Bros., London. New Factory at Harrow for Kodak, Ltd. Contractors: A. Jackerman and Sons, Slough. Business Premises, Dublin, for Messrs. Hely, Ltd. Architects: Batchelor and Hicks, Dublin. Contractors: J. and R. Thompson, Dublin. Dyeing and Cleaning Works, Belfast, new building for the Monarch Laundry, Ltd. Architects: Batchelor and Hicks, Dublin. Contractors: J. and R. Thompson, Dublin. Floors and roofs of new works for Messrs. Steiner and Co., Ltd., Calico Printers and Dyers, Accrington. Contractors: The Liverpool Hennebique Ferro-Concrete Contracting Co. Floors, Horsforth Sunday School, Horsforth, near Leeds. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds.

IMPORTS.

PORT OF DUBLIN.

April 18, per Brackley, from Runcorn, 25 tons bricks, T. Archer; 25 tons bricks, Monsell, Mitchell and Co.; 80 tons bricks, T. & C. Martin, Ltd.; per Lilla, from Bridgwater, 75 tons bricks, J. McFerran and Co.; 30 tons bricks, Brooks, Thomas and Co.

April 19, per Hammore Head, from St. John, N.B., 46,388 pes. deals and ends, to order; per Thelma, from Goteborg, 6,400 bundles laths, to order; 19,559 pieces planed boards, to order; per Ellie Park, from Connah's Quay; 150 tons brick goods, T. Archer.

April 20, Portia, from Rochester to London, 600 tons cement, T. and C. Martin, Ltd.

April 21, per Aransi, from Chester, 145 tons bricks, J. and P. Wood, Ltd.

April 24, per Dinorwic, from Rochester, 190 tons cement, A. Agnew.

April 25, per Willie d'Eu, from Treport, 200 bags plaster of Paris, to order; per City of Berlin, from Ghent, 11,390 bags cement, to order; per Result, from Chester, 180 tons bricks, T. and C. Martin, Ltd.; per Lady Martin, from London, 1,750 bags cement, T. Dockrell, Sons and Co., Ltd.; 200 bags whitening, do., do., 160 bags cement, to order.

April 27, per Bangor, from Newcastle, 335 tons cement, Norman McNaughton; per Enid, from Glasgow, 92 tons bricks, Monsell, Mitchell and Co., Ltd.

April 30, per Lord Charlemont, from Baltimore, 78 logs hickory, 778 pieces oak lumber, to order; per Lord Roberts, from New Orleans, 608 pieces pine lumber, 6,085 pieces furniture wood, 112 logs hickory, 1,124 pieces cottonwood lumber, to order; per Spencer, from Belfast, 130 tons bricks, H. and J. Martin, Ltd.

May 1, per Florrie, from Bridgwater, 155 tons bricks, T. Archer; 5 tons bricks, Woods, Webb and Co.; per Ellen Myvanny, from Carrickfergus, 90 tons bricks, H. Lavery and Sons, Ltd.; per Jessie, from Glasgow, 110 tons fireclay goods, M. Doyle and Co.

ENGINEERING NEWS.

Athy.—The Urban District Council of Athy, county Kildare, are prepared to receive tenders for the execution of the following contracts:—Constructing reservoir and intake wells, and carting and laying about 10½ miles of 6 in. to 3 in. cast iron pipes, valves, etc.; supplying and delivering in Athy about 670 tons 6 in. to 3 in. cast iron pipes; supplying and delivering in Athy the requisite valves, hydrants, etc. Plans and specifications can be seen at the office of the Engineer, Mr. James F. Reade, A.M.I.C.E., 9 Bridge-street, Westminster, S.W.

Blackrock (Co. Dublin).—The Urban District Council of Blackrock are prepared to receive tenders for the supply and erection of a 9-inch positive water meter, fitted with diagram recorder. Tenders to be lodged Tuesday, 15th May, 1906.

Cork.—The Rural Council will, on 17th May, receive tenders for construction of Waterworks at Knockraha, according to plan and specification which may be inspected at the Boardroom Cork Workhouse.

Cork.—The Cork Rural District Council received tenders for execution of the following works:—Laying sewer at Dock-street, Passage West; building wall to enclose reservoir at Blarney Waterworks.

Dundalk.—The Dundalk Urban District Council considered tenders for fitting up urinals in Town Hall, additional fittings of carpenter work, etc., to stage in Town Hall, and extension of sewer in Camp-street.

Dublin.—The Electric Lighting Committee invite tenders for the erection of an electricity sub-station at Fairview, Dublin. Tenders to be lodged on Monday, May 14th.

Lisburn.—At the last meeting of the Rural District Council Mr. Higginson gave notice that at the next meeting of the Council he would move that the area of charge for the proposed sewerage works for the village of Dunmurry be the Malone electoral division.—Mr. Daniel Cameron, Exeter, was appointed a consulting engineer in connection with the Dunmurry sewerage scheme, at remuneration to be covered by £15 15s. for fees and £5 5s. for travelling expenses.

Lucan.—The Governors of St. Patrick's Hospital received tenders for the supply and erection of an electric generating plant, storage battery, cables, and house-wiring for their residences at St. Edmundsbury, Lucan.

Meath.—ARTERIAL DRAINAGE.—THE DEE DRAINAGE WORKS.—The Arterial Drainage Commission held a sitting at Dublin recently, at which Admiral Singleton, C.B., representing the Ardee and Nobber drainage districts, expressed the opinion that the local County Councils should not interfere in the drainage of these districts. The Ardee District Drainage Works drained the portion of the river Dee in the County Louth, and were carried out some fifty years ago. The Nobber District Works drained the upper portion of the Dee in the County Meath. They had been executed many years ago and become derelict, but some years ago the works were carried out once more. Witness, in dealing with the question of obstructions caused by weirs, referred to the desirability of removing a weir on the Dee near Ardee. The effect of this weir was in time of flood to prevent the escape of the back waters of the river, with the result that the Ardee bog was sometimes flooded completely, and the poor people of the bog lost their small crops of potatoes, oats, and hay, which were swept away. The chief reason of his objection to allowing County Councils to interfere in drainage work was that the rates, which were constantly rising, might be further increased.

Wexford.—At present there exists in Wexford Co. Council vacancies for three assistant surveyors.

Warrenpoint.—URBAN DISTRICT COUNCIL.—This Council are prepared to receive tenders from persons willing to contract for the construction of baths in accordance with plans and specifications prepared by Messrs. Kaye-Parry and Ross, civil engineers and architects, 63 Dawson-street, Dublin. Tenders to be delivered at the Town Hall, Warrenpoint, on 15th May.

Youghal.—The Committee of the Youghal Auxiliary Asylum invite tenders for the supply and erection of a metal tank, to hold about 10,000 gallons of water. The specification may be seen at the office of Messrs. W. H. Hill and Son, architects, 28 South Mall, Cork. Tenders to be lodged before ten o'clock on May 8th.

TENDERS.

Dundalk.—Erection of a residence on the Forkhill-road, Dundalk, for Mrs. Johnston. W. S. Barber, Esq., Francis-street, Dundalk, architect. James McAdoney, Dundalk, £1,446; Samuel Pardo and Son, do., £1,411; Thomas McDonald, do., £1,410.





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## TOPICAL TOUCHES.

Last week, at Bellvue, Delgany, there took place the sale and dispersal of the La Touche collection of valuable and rare old furniture, pictures, and objects of art generally. The prices ruled high, and the total sales reached, we understand, over £13,000. The sale was attended by numerous dealers from over the water.

A reverend gentleman residing in the country recently drew our attention to the large and increasing number of these dispersals of collections during the past few years in Ireland, and to the fashion in which the country is being depleted of such objects of art. In his own immediate district he could point, he said, to quite a number of small collections which had been thus dispersed. Of course, Dublin dealers attend these sales and buy largely, but their market is mainly with rich Americans and English visitors, so that the bulk of these things are entirely lost to the country. It seems rather a pity that some persons, representing the Art Museum and the National Picture Gallery, should not regularly attend the more important of these sales and buy in for the nation pictures and objects of real merit; for instance, the La Touche pictures included a reputed Velasquez.

Bellevue itself is a fine old Irish mansion, charmingly situated in a beautiful demesne. It was built by the well-known David La Touche, the banker, about 1780, and many famous men of the day, including Henry Grattan, were there entertained.

The appalling disaster in San Francisco seems to have abundantly demonstrated that the steel-framed form of construction is the best calculated to resist an earthquake shock. The Palace Hotel, which was specially designed on these lines, appears to have come through the ordeal almost intact in its main construction, though subsequently destroyed by fire.

The "Leinster Leader" records an amusing tender. A gentleman named James Foley, Edenderry, tendered for the sweeping of the workhouse chimneys at £7 per annum. Martin Baker, Knockcor, wrote stating that he would clean the chimneys for 10s. cheaper than Foley (laughter). One of the Guardians observed "That's not a tender." Chairman: "Foley's price seems too high." It was ordered that the contract be re-advertised!

The visit of the members of the National Federation of Master Builders of Great Britain and Ireland, referred to in a recent issue, has been definitely arranged to take place here in Dublin on the 1st of August next. The Council meeting will be private, and will take place on the 31st July, the day before the general meeting. The general meeting will be attended by some two to three hundred builders, representing all the different centres in the United Kingdom, and is a gathering of considerable importance to all interested in the building industry. We intend publishing a special supplement to our issue of the 4th August, devoted to a record of the congress.

The contract for Messrs. Coghlan's new business premises in Exchequer-street, Dublin, has just been let to Messrs. Coniffe and Dillon, of Gracepark-avenue, North Strand. The architect is Mr. Francis Bergin, of Westmoreland-street.

Mr. Good, hon. secretary, M.B.A., in his letter in our last issue draws attention to the fact that "all candidates for membership of the Quantity Surveyors' Association in London must agree to be personally responsible for the accuracy of their quantities." A subscriber, a well-known quantities surveyor, and a Dublin man, expressed to us his very ready willingness to be responsible for his, if the London fees were obtainable here!

The Select Committee of the House of Lords has rejected the Mullingar, Kells, and Drogheda Railway Bill. This railway would have served a most useful purpose in providing quick and direct communication between the three important centres named, and would have stimulated trade and industry by, to some extent, removing a monopoly, and thus cheapening the cost of transit. The Bill had the general approval of three County Councils, and the only opposition came from the Midland Railway. The fate of the Bill is certainly most unfortunate for all concerned, save and except the railway companies whose monopolies it threatened.

The Cork City Railways Bill is at present under the consideration of a Select Committee of the House of Commons. The construction of this linking line would have a most useful effect in bringing the south-west portion of the county into more direct communication with the outer world, and it is to be hoped the Bill may escape the fate of the Mullingar and Drogheda Bill.

The Arterial Drainage Commission has been sitting at intervals in Dublin during the past few weeks, and much important evidence has been taken. This, however, included a great deal of repetition. Opinion seems to conflict between handing over the control of the entire system of arterial drainage in Ireland to the County Councils, or to create a new central drainage board in Dublin, while some witnesses, apparently in a minority, advocate the retention of the present system.

We sincerely hope that another Board will *not* be created, and the present local drainage Boards are too restricted in their operations and area of charge. The great difficulty seems to be how to deal with the lower reaches of rivers, the level maintained in which renders drainage operations higher up of non-effect. Moreover, in many places, owing to the restricted area of charge and consequent small rate raised, the works are not effectively maintained, but are suffered to fall into disrepair. The County Councils seem to be the natural controlling bodies; but where a river to be dealt with passes through several counties, control might be exercised by "joint committees of management," in a manner similar to sewerage works, which operate in two districts, or lunatic asylums which are under the control of such committees, usually representative of two or more County Councils.



The new additions to the Rotunda Hospital, for which Mr. A. E. Murray is the architect, are progressing rapidly.

The membership of the Royal Institute of British Architects now totals nearly 2,000. There has been an increase of 277 since 1901.

It is notified that the International Congress of Architects will be held in London from 16th to 21st July. Large numbers of architects have notified their adhesion.

The late Miss Eliza Barbour, of Brighton, who died on 31st March last, has bequeathed £5,000 to the Meath Hospital to build a new wing, to be called "the Eliza Barbour Ward," and £6,000 to build a Convalescent Home for the poor of Dublin. A number of minor bequests follow.

The quantities for the Royal Dublin Fusiliers' Monument have been in the builder's hands since the 12th inst. They have been prepared by Mr. Samuel H. Bolton, and the estimates are required to be with Mr. Feutland, R.H.A., the architect, on the 24th inst. The monument takes the form of a Trojan arch, and the estimates are to include six alternative sorts of stone.

Adverting to the San Francisco disaster, the "American Carpenter and Builder," with characteristic American energy and hopefulness, declares that "the energy and pride of the West will assert itself and prove to the world that no matter how great the calamity they will be able to rise above it. The problem for the future is what materials to use so as to guard against a similar occurrence. Will steel and iron be used exclusively in the business sections or will the structures be all limited to a certain height. The problem is a new one, and will require considerable thought and study."

As already announced, the Institute of Clayworkers will visit Ireland this year. The party, which will consist of not less than twenty, will leave Euston on Friday morning, June 1st, and travel to Chester, where the annual meeting and dinner will be held. The following morning members will have a look round Chester, leaving in the afternoon for Dublin via Holyhead. The next two and a half days will be spent in Dublin, where a visit to the works of the Dolphin's Barn Brick Co., Ltd., Dublin, has been arranged, as well as visits to interesting places, such as St. Michan's Church, Guinness's Brewery, the old Houses of Parliament, etc.

On June 5th the party will leave Dublin for Belfast, where visits will be paid to the Lagan Vale, Messrs. McGladery's, and Messrs. Murphy's works. On the 6th of June it is proposed to make a trip to the Giant's Causeway. The return journey will be begun early on Thursday morning, June 7th, the party arriving in London on that evening.

On Monday next a general meeting of the Royal Institute of Architects will be held, when the proposed new conditions of contract will come up for consideration. We trust that the form finally evolved may be of a simple and clear character, tending to avoid both arbitration and law, for the one procedure is as bad as the other. At the same meeting a proposal will be made to raise the annual subscription of the members. We can see no possible justification for this course, and we understand it will be strongly resisted. The Institute, as a body, takes little or no part in public affairs, its meetings are confined to stated general meetings for purely formal business, and when a great opportunity arises for asserting itself as, for instance, the case of the Dublin Exhibition scandal, no action is taken.

### STAINED GLASS.

At a recent meeting of the Royal Institute of British Architects papers were read by Messrs. Alexander Gascoyne and A. J. Dix on "Stained Glass," the following being abstracts:—

Mr. Alexander Gascoyne, referring to examples that remain of old stained-glass work, said that, without attempting to copy deliberately, many lessons may be learnt from it. If once we can catch the spirit and feeling that inspired the early glaziers, and work it into modern requirements, we shall be progressing towards perfect work. No better model could be desired than the beautiful arrangement of the best 15th century glass—e.g., York Minster and Morley Church in Derbyshire. The windows in the north of the nave of Ely Cathedral also afford excellent examples. Whether or not glass can be manufactured equal to the old glass is a matter of opinion; but by waiting and picking out the choicest sheets at the makers', and carefully selecting these, results can be obtained which will compare favourably with the early windows. It is the inequalities, variations of thickness and colours, and accidental markings which give the depth and brilliancy to the glass, and upon their judicious employment depends the success of the work. In good work the cost of the glass rarely, if ever, enters into the consideration of the glazier; he chooses the various glass as the artist does his colours. Beautiful results can be obtained by giving a free rendering of the early principles, and by designing foliage or ornament to take the place of canopies and bases, without losing the feeling or character of the old glass. It is immaterial what particular style is adopted provided we allow our originality to develop that style, and produce stained glass which for charm of design and colour will adapt itself to the character of the building. The assistance architects can give in suggestions for the general schemes of windows cannot be overestimated; their co-operation has produced in many instances most successful results. When the profession as a whole demand really good work, and encourage designers who are known to have the interests of their craft at heart, there will be no lack of beautiful work. But so long as the greatest demand is for the cheapest article, it cannot be expected that the domestic or ecclesiastical stained glass of this country can improve. A stained-glass window need not necessarily be expensive. It can be made simple in design, and therefore not costly; but it does not follow that it is not in the best possible taste, and that the best material has not been used. The author impressed upon those designing stained glass for churches that the windows have a double mission—they should form a beautiful decoration and be devotional in feeling. The figures introduced should be an aid, not a hindrance, to devotion. Arouse the critical faculty, and no devotion is possible. To design some windows much careful consideration is necessary; really good work can hardly be done unless the artist is personally in sympathy with the object of the design. The author cited various errors in the treatment of windows due to the unsympathetic artist. The designing of a church window should be a work of love, and the artist will not be satisfied unless the symbolism truly interprets the teaching. Stained glass for modern dwellings should be designed to form part of the decorative scheme; the building itself should be seen before preparing designs. Rich colour schemes should be used with the greatest care. Simple treatment in white glass has been used by some architects with the most satisfactory results, harmonising admirably with any style of decoration. The importance of massing the design in domestic ornamented glass cannot be overestimated. Referring to the full-size detail drawing prepared to give the architect an idea as to the general effect of the leads, the author pointed out that this was not a working drawing; a line drawing of the various shapes of the glass had to be prepared to guide the cutter in cutting the glass, and the glazier in piecing it together; unless every care was taken with this drawing all the architect's trouble might be lost.

Mr. A. J. Dix, after explaining the difference between stained and painted glass and defining the term "stained glass," said what he proposed to deal with was the making of what is generally understood by a stained-glass window—i.e., the using of the material in such a way that shall interest and charm by a variety of design and combinations of colour in which it may be employed. A design for a stained-glass window may be in any medium and upon whatever material that most commends itself to the artist, even painted on glass in transparent colours, or of small pieces of the actual coloured glass itself put together like a mosaic. Nor is it even necessary that a design should be made at all; the cartoon may be drawn in the first in-

stance, and a colour scheme for guidance in choosing the glass may be a coloured photograph of the cartoon, or a sketch to scale of the lead-work, coloured in, perfecting the scheme already in the mind and suggested by a possible rough sketch made before starting the cartoon. In the author's opinion the highly-finished competitive design for a stained-glass window is a mistake, a delusion, a snare. An attractive design is by no means a guarantee of a good window. The capabilities of a maker of stained glass should be judged by his finished work and not by design. One very important point to observe is the architectural fitness of the design—*i.e.*, its suitability as regards proportion, not only as a whole, but in detail. It should always be treated in such a way that will keep the window subservient to the architecture, about which there need be no fear if a strict adherence be observed to the natural limitation of the material. The position and size of window should be thoroughly considered, as much detail is often thrown away and a broadness of effect missed by over-elaborating a window which is only seen from a distance; also the amount of light one may safely exclude without over-darkening the interior of the building should be considered. Having referred to the cartoon and skeleton drawing, the author went on to speak of the selection of glass—perhaps the most interesting and absorbing stage in the work—and described the various colours or tones giving the most satisfactory results, and the methods of their employment and arrangement. The practice of superimposing pieces of glass held together in one lead in two or even three lavers, called plating, though occasionally a useful expedient, the author considered should not be resorted to until every resource had been exhausted to obtain the required colour or tone. As regards the best 'tint of white glass, one could not go wrong in choosing a tint so often found in early glass—*i.e.*, a cool greenish hue. Describing the method of preparing and arranging the glass before painting, the author emphasised the importance of viewing the glass so prepared in a position against the light, as it will be in the window when finished. Now is the time to make any alteration desired. If the corrections are not made now before the work is painted, any offending pieces will be more reluctantly discarded at a later period. The whole making of a stained-glass window should be one of elimination, adding to, and correction, not only in the initial stage of the glass in its raw state, but as the work proceeds, altering the work to obtain the effect aimed at as it progresses. In the process of painting, and, in fact, at no period, should anything be taken for granted: the work should be viewed in a perpendicular position, and from as great a distance in the studio as possible, and no advance made until at each and every stage nothing suggests itself that could possibly be improved upon. The author went on to describe the process of painting the glass, the pigments employed, the firing, leading, etc.; and, in conclusion, he referred those who wished to make a study of stained glass to the works of Winston, Mr. Westlake's "History of Design in Painted Glass," Mr. Lewis F. Dav's "Windows," and Mr. Whall's book in the "Artistic Craft Series."

Mr. J. D. Crace, in proposing a vote of thanks to the readers of the papers, said there were so many points touched upon that it was impossible to follow them one by one, but there were a few which he might be allowed to refer to. He thought that Mr. Dix had done very valuable service in bringing before them in so conspicuous a manner the action of the atmosphere and rain upon old glass, and he did not think any of them quite realised the great extent to which the surface of glass was changed, and, of course, the admixture of black, which was what it practically came to, had a wonderful effect in toning and harmonising the colours. He quite agreed with Mr. Dix that no amount of weather would make a bad window a good one, but there was no doubt that the action of time was a very kindly one upon the harmony of colour. One point which he had rather hoped would have been touched upon was the great importance in stained glass of producing what was generally known amongst painters as the palpitation of colour, by varying the depth of the colour individually used in any one mass. There was no doubt that a great deal of the jewel-like effect produced in the best windows was the result of varying the amount of power in the colour presented both in the one mass and in those which surrounded and contrasted it. The art of putting colour together in a glass window was a sort of special art, inasmuch as that one had to deal with colour in a more intense and pure scale than in almost any other branch of art. Of course, the painter toned his colour as he went on, but, under any circumstances, could not produce so rich a result as even a moderately brilliant painted window. The very beauty produced by brilliancy was also a sort of standing danger.

One of the points of great value to those wishing to influence the colouring of windows which might be executed for them was that of having the glass when selected arranged on a plate-glass screen. That was a most useful and necessary thing. It was necessary for the artist engaged on the work and to everyone concerned in the responsibility for the production of a good window. It enabled, in the first instance at any rate, any slip of judgment in choosing the glass to be corrected before too much labour had been expended on it, and it undoubtedly had the effect of showing the artist the accuracy of his work in its crudest form, and therefore enabled him to make the corrections upon a proper scale. He supposed that few men who really cared about their work ever could finish a window, even if it was leaped up, without wishing to change a few portions of the glass. He would certainly recommend anyone who was interested in a window to carefully look at it against a light as nearly as possible like that which it was to be exposed to before it was finally soldered together. This final inspection would often save a great deal of trouble afterwards. He was glad to hear Mr. Gascoyne refer to the Florence windows, because he did not think that either architects or glass-stainers until recent years had given half enough attention to the lessons to be learned from Italian glass. Perhaps he ought to say glass in Italy, because there was a great deal of beautiful glass in that country which undoubtedly was produced by skilled Frenchmen brought there. At Florence and Siena a number of beautiful windows were produced from designs by Gh'berti, as well as by Ghirbaindajo. He would only say to any young architect who might be going to Italy for other purposes that any time he could spend on stained glass would be time well devoted. It is characteristic of the guide-books for English tourists that stained glass, as an object of interest in any Italian church, is rarely mentioned. To read Baedeker no one would suppose that at Florence the Cathedral, Sta. Croce or St. Maria Novella were full of splendid glass—the same at Assisi or Siena.

Mr. G. H. Fellowes Prynn, in seconding the motion, said that Mr. Dix had stated with much truth that many of their churches had been ruined by restorations, but more, he thought, had been ruined by the bad glass put into them. If, as Mr. Dix had said, the artist in stained glass really would work with the architect, especially in church work, they would, he was sure, work together harmoniously, and the effect generally would be far better. It was that want of touch between the artist in painting and the architect that was so often felt in their churches. They found that after the church had left the hands of the architect one glass-painter was turned on and then another, and so a sort of competition ran round the church, for there seemed to be no unanimity and no unity of effect at all by such method, or rather want of method. He was sure that glass-painters must feel this themselves. Mr. Dix said that where he had the opportunity of putting in very elaborately-coloured windows it was a great opportunity, but he (the speaker) was not quite so sure of that. If there was too much of that single opportunity it was very often disadvantageous to other glass in the church, and to the general harmony of effect. The thing must be considered as a whole, and he was sure Mr. Dix would agree with that. When they got brilliant lights, as they would in the east, it was the greatest possible mistake to overdo the light glass. Of course, green glass, as they had seen, had been exaggerated, but he was not sure that it had not been an exaggeration in the right direction. As they all knew, white always exaggerated itself. If they put a piece of white next a piece of red the red must necessarily look smaller. The white really took away from, or rather spoilt, the proportion of the surrounding colours, so that little pure white could be used advantageously in stained glass—it must be toned with a very distinct tone of warm yellow or green. With regard to the cartoons Mr. Gascoyne had set before them, he might say that, in the cartoons and illustrations put before them that night, it would have been better if the lines separating the portions had been shown, because they become a very important feature in arranging the design. In all cartoons they were apt to be misled, for in the glass the lines were apt to come at very awkward places, and so it was obvious that in the cartoons they should be shown as much as the lead parts. The bars must be considered, for they were necessary to support glass. Those who had been to Huy, in Belgium, must have been struck with the very long narrow windows with the single mullions running down, surrounding the apsidal east end of the cathedral. They were simply magnificent—not so much in the actual quality of the glass, but as to the colour introduced. The actual glass itself was not particularly good, but age had acted upon it to a certain extent, and the narrow and general massing of lines of colour were sublime in their



effect. He agreed with Mr. Gascoyne in his idea of a man thoroughly entering into the symbolic feeling of what he designed, for this was absolutely essential. Unless the artist really had that feeling in him (and this applied particularly to church work) there would be but little to admire in his work, but they saw the mannerism of this or that stained-glass artist standing out in a window rather than the devotional or poetic effect he should try to get in the window. They often found artists who laid down a definite rule that they could not treat single lights with anything but single figures. He sympathised with them to a great extent when clients came and said, "We want a sea scene, or most elaborate pictures, brought into a space of about 9 in. or 12 in." That was hopeless in glass as a rule, and one sympathised with single figure treatment on the whole, but he thought it could be carried too far. He felt that there should be a certain amount of "lesson" or teaching in glass, whether historical, devotional, religious, or whatever it might be. If they had a single figure, it was a very usual thing in the fifteenth century to find some sort of story, martyrdom or event in the life of the individual. It was common to find some historical or interesting event depicted below on a smaller scale, and very often there was a little inscription which did tend to interest the ordinary beholder. That was, of course, wholly independent of the scheme of colour which one would try to carry through. He did feel that the more the stained-glass artist could throw the real devotional feeling and poetry into his design, the better he would make his work, and this was the same with artists and with architects.

Mr. G. Hubbard said it had occurred to him sometimes in glass-painting that if they had more white glass introduced they would have a better chance of judging the richness of the colouring. As a rule, old glass always appeared to be a medley of colour. He did not say that the effect was not extremely charming, but he did not think it possible to compare one colour with another. They could not compare the full power or intensity of blue with red, and he thought he was right in saying they could only compare all colours with white, and unless they had a sufficiency of white glass they did not get a true appreciation of the full intensity of the colours. He did not say that they must have a clear, transparent white glass which would be dazzling, but when he was at Chartres he was struck with the richness and beauty of the glass in the window of the cathedral. He had the opportunity of viewing it, not only from the interior, but he got on to the roof and examined the glass from outside, and he found that the glass had been washed over with what appeared to be a sort of thin cement-wash. It occurred to him at the time that possibly the great richness of the colour was due to this cement-wash, and he would like to know whether that wash was put there to preserve the glass or whether to add to the richness of the colouring.

A member asked if Mr. Hubbard referred to the large figure in the nave.

Mr. Hubbard said it was thirteenth-century glass, but it was long ago that he saw it, and he did not remember which window it was.

Mr. H. Townsend said that Mr. Dix had referred to the American system of superimposed glass, and, while admitting that it produced certain beautiful effects, he said that it was not an entirely legitimate way of carrying out the work. Mr. Dix left it at that point, but he (the speaker) would like to know why it was a particular offence to produce by the means of glass, whether superimposed or singly, the best effect one could, and why one should hesitate to use double thicknesses if one thought one was going to gain in colour, effect and value.

Mr. E. W. Hudson said that, with regard to the disfigurement of the glass by the saddle bars coming across the design, he believed it was a fact that the cames were made so well that it was almost unnecessary to introduce these cross-lines, which naturally would be a disfigurement. He believed also in large windows it was the custom to adjust the bars rather to suit the principal lead lines. As to superimposed glass, he believed it was the fact that there were grades of thickness and grades of density of colour in the same glass, so that they could select them graded, which would give much the same effect as superimposed glass would give. They must have been struck with the beauty of the drawing of the cartoons shown, and also the executed glass, but one could not help thinking that they were intended to be viewed from very close down. With regard to the glass, it had to be placed at a much greater height if he supposed there was nothing amongst the cartoons showing the strength of the lines which would be adopted for 30 ft. or 40 ft. high. He was much struck many years ago with the painted glass in the Abbey Church of St. Denis, and thought that a magnificent effect was produced, but

some years later he went with strong glasses and looked at it, and he never saw a more dreadful instance of drawing representing the human form divine than in that glass.

The Chairman said it was important, as was pointed out by Mr. Gascoyne, that in church windows there should be a strong devotional feeling in the work. By that he took it that Mr. Gascoyne meant there should be no disturbing element in them, and that anything which seemed to suggest a problem to be solved was a mistake in a place of worship, for immediately the mind would be occupied in trying to solve the problem instead of being impressed by the beauty and quietness and silence of the windows. Another matter which had been mentioned, and which was of importance, was that the building should be first seen before the glass was designed. If the stained-glass designer had no idea of the aspect or the height of the window from the ground he could not by any possibility design a window suitable for its position in the building. He had had experience of a case where some stained-glass windows were wanted for a staircase which was abundantly lighted, but was chiefly lighted from a skylight above. The windows were some 10 ft. from another building, so that there was no direct light upon the staircase windows. There was a competition for these windows. He knew nothing about it at the time, but several eminent artists were requested to send in designs, and it happened that the selected artist had not seen the building, and had taken no particulars even of the size of the opening, and when the window was sent down completed it was at least 15 in. too short, and the effect was disastrous. The work was entirely a failure, and the committee called him (Mr. Belcher) in to know what was the matter. The artist said that too much light had been supplied on the staircase, and that they should put electric light behind. The whole intention was spoiled, and he hoped eventually to have the window removed and proper glass put in. When he was a young man he imagined that he could design stained glass and do everything necessary in a building, and he did design some stained-glass windows, but was glad to say he had since removed them. Mr. Dix mentioned that it was important that the question of scale should be considered; that in the examination of a building and in noting the scale and general disposition of its parts the artist should be guided in the scale of his figures. The history of stained glass had not been much gone into, but it had been rather hinted that the fifteenth-century glass was that which they should endeavour to copy. He felt very strongly that, if possible, all their work should be designed in the twentieth-century style, and that they should avoid, as far as possible, mere imitation. If they could develop the beauty of stained glass, by all means let them do it, and adopt every method and every feeling that came to hand, and also endeavour, as far as possible, to make it suitable for the positions which it was to occupy.

Mr. Gascoyne replied, and said that, with respect to the question of cement-wash outside the windows of Chartres Cathedral, what Mr. Hubbard saw was no doubt the effect of age, and was not cement at all. It looked just like cement, but it was simply the effect of age corroding the glass on the outside. They would notice the same at Cologne. With regard to the work at Florence, they could see one light in the Duomo Museum at the back where they had the opportunity of examining closely the glass which looked so well in the clearstory window, and they would be struck with the difference.

Mr. Dix also acknowledged the vote of thanks, and said that, in regard to the question of superimposed glass, he had given a strong reason in his paper for not liking it. It appeared to him that the method was not quite playing the game. If a man could not get with one layer of glass the effect he wanted in his stained-glass window, he thought he had better leave it alone. That idea would certainly be borne out if they wished for their work to be looked at when time and atmosphere had done their work. If they wished their work to remain until, as in the case of the York windows, it had to be placed between sheet-glass, then it would be impossible, with the superimposed method, for the glazier to put it together. What was supposed to be a cement-wash was absolutely due to the effect of the atmosphere. It had all the appearance of being washed over with cement, but it was simply decay.

#### PHOTO-PRINTS BY ELECTRIC LIGHT.

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CORRESPONDENCE.

CONDITIONS OF CONTRACT.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER..

SIR,—It would seem to me that the letter from the respected Honorary Secretary of the Master Builders' Association in your last issue is really the only matter that has yet appeared regarding the above that brings the subject clearly before the man in the street.

I very gladly welcome it, because I think it is easy to show, first, that surveyors should not be called upon to bear the cost of work that others get the benefit of; second, that arbitration is a poor remedy for a builder's grievances; third, that contractors are not, in my opinion, likely to be better off under the proposed new conditions than under the old; and, fourth, that from the nature of his work, an architect will hardly be satisfied to delegate his right to say what he requires, or what he asks for, to anyone else, whether an architect, a surveyor, or any other expert in building matters.

It is the plainest equity that a builder should not be asked to pay for work the benefit and enjoyment of which the building owner gets. For the same reason, the surveyor should not be asked to pay for it. It would indeed be a lucrative occupation if out of £1½ per cent. he had to pay for a serious omission. What professional man is asked to bear such a burden? Is an architect, an engineer, a lawyer, a doctor, or an accountant? Mr. Good speaks with knowledge, I am sure, when he says the members of the London Surveyors' Association guarantee their quantities. It may be so. I do not know much of the English practice of late years; but I do know that several actions have been taken against surveyors, and that they all failed on the score that no action at law lay unless fraud were proved, which is practically an impossibility. Therefore, I view the requirement of the London Association as as piece of Anglo-Saxon bluff, which means nothing in reality. Now, as a matter of fact, do contractors suffer seriously from surveyors' mistakes? I do not think they do. No case of the sort has come under my notice in a fairly long experience. For these reasons, I think the master builders ought to leave the surveyors alone. They do not make stronger their already strong case by seeking to impose on surveyors a liability which they themselves most properly object to, and which neither of us should bear.

Now, as to arbitration, this method of settling building disputes is worse than law. It is horribly expensive, slow, and unsatisfactory. Was a contractor ever satisfied with it? Was Portrane arbitration satisfactory to the contractors? I shall be glad to hear it was, but I doubt it. I can conceive a court of arbitration, based on the French Courts of first instance, which practically entail no cost, and are most satisfactory and direct. No one seems, in what has already appeared, to know exactly what kind of an arbitration court is wanted. What at present exists is a huge humbug.

Contractors will not, in my opinion, be better off by the new or any altered conditions. Arbitration I put as'de as useless, unless of the French sort; and I do not know how this can be arrived at. In France, the Government pays the judge, and no cost is borne by the disputants. The effort of the judge is to get them to agree without proceeding to law. No counsel are employed. The litigants make their own cases in their own way. Now, take the condition quoted by Mr. Good (English form). This is clearly inequitable unless a remeasurement takes place. Again, the building owner and architect are at a disadvantage, as they would have difficulty in finding out the surplus items to set against the contractor's claims for deficiencies. The Scotch system, which I know well, means a remeasurement. With their usual good sense, the Scotch deal with the matter directly and honestly. All this, however, means extra fees for the surveyors, and I am of opinion that building in this country is already costly enough. I affirm that a remeasurement will not, in ninety cases out of a hundred, benefit the contractor. Indeed, my own experience shows me it will be against him almost every time.

Now, as to the architect's control over his own work. It is impossible to take this away from him, and it is an absurdity to place it in the hands of another person. An architect is an artist, or ought to be. He, and he alone, knows what he wants. In the questions that from time to time arise between architect and contractor, the architect must be, and must remain, the sole judge.

I have said frankly what I think on these matters, and I hope that the master builders will not take me as being in any way hostile to them. I most readily say that I desire to see them fairly treated, and to do well in the work they undertake. I know them to be a fair-dealing and honour-

able body, and I write this for the purpose of trying to seek out a remedy for their complaints. Theirs is a laborious and risky business, requiring unceasing care and thorough knowledge. It stands to reason they should profit by their work. A small profit will not pay them for the labour their work involves and the great risks they run.

But, it behoves architects, surveyors, builders, and the working man, whom it very directly concerns, to do everything they can to reduce the cost of building in this country. Building is a luxury, and when it becomes too dear it ceases to be wanted. I would like to see the working man paid good wages and see him give a good day's work in return. I believe this is compatible with even an eight hours' day. But he should always keep before him that if he does not give value for his pay he is committing economic suicide. As to building material, what we ourselves do not make or produce is cheap unless when affected by expensive carriage. Most things made here in connection with the building trade, except in the Belfast district, are dear.

The sovereign remedy for the building trade would be for the workmen to give a fair day's work, and for the people at large to make at home a multitude of things which we now import from England and elsewhere. We have at our hands magnificent stones of all sorts, the best of brick and pottery clays, good slates, and many other things, that if made up in Ireland would do wonders to make building much cheaper than it is. While I am on this subject, let me call your attention to the surprising evidence given by a gentleman described as consulting architect to the Lunacy Commission, before the Royal Commission on Lunacy, at present sitting in the Shelbourne Hotel. He says: "You can get far more work out of an English workman than out of an Irish." I am well aware building is much cheaper in England, but I am also aware that the English master builders complain of their workmen perhaps much more than the Irish do. If the statements made before the Royal Commission are true, it would be well for all concerned to look to it. I am afraid that the guaranteeing of quantities will not save the situation if the consulting architect to the Lunacy Commission is correct in his evidence.—I am, sir, your obedient servant,

D. W. MORRIS.

68 Harcourt Street,  
Dublin, 5th May, 1906.

OUR ILLUSTRATIONS.

Curate's Residence, Killodiernan, Co. Tipperary.

We reproduce this week three designs of Messrs. Moynan and Gill, Architects, Nenagh. One is a curate's residence at Killodiernan, Co. Tipperary, which has been completed. The materials used were—Rubble masonry walls, plastered and rough casted externally; thin division walls, and chimney breasts and stacks, built of Athy stock bricks; Killaloe slates for roof, with red ridge tiles; plain red tiles over porch and bay window; red deal for joinery; white Norway for carpentry; pitch for front entrance door and staircase. The amount of contract was £400, and the contractor was Mr. James Burke, Nenagh.

New Schools, Church-road, Nenagh, Co. Tipperary.

The new schools at Nenagh are also completed. The drawing shows the school building, which is part of a scheme comprising school with teacher's residence, out buildings, play grounds, boundary walls, etc., at a total cost of £851. The materials used were—Rubble masonry walls, plastered and rough casted; thin division walls and chimneys, built of Athy stock bricks, Killaloe slates for roof, with red ridge tiles; red deal for joinery; white Norway for carpentry; heated with a Shoreland's stove and grates; ventilated with patent self-acting air pump ventilator; air inlet brackets in walls, and opening sashes in windows; wrought-iron palisading and entrance gates, supplied by Bayliss, Jones and Bayliss, Wolverhampton; school furniture supplied by Messrs. T. and C. Martin, Dublin. The contractor for school and teacher's residence (£629) was Mr. Michael Dooley, Nenagh, and for outbuildings and boundary walls (£222), Mr. Patrick Mulcahy, Nenagh.

Dispensary Residence, Ferbane King's County.

The dispensary residence at Ferbane for the Birr Board of Guardians is in course of erection. The materials to be used are—Walls built of local "Gallen" bricks and plastered and rough casted; roofs slated with Killaloe slates; red deal for joinery, and white Norway for carpentry. Amount of contract for buildings and including drainage, hot and cold water supply, etc., is £1,900, and the contractor is Mr. D. P. Hector, Birr. The other tenders were—Mr. James Burke (Nenagh), £1,472; Messrs. J. Hickey and Sons (Birr), £1,398; Mr. Gerald Cusson (Birr), £1,364. Architect's estimate, £1,329 13s. 0d.



## LAW.

**The Portrane Asylum Arbitration.—Local Government Enquiry as to Cost.**

Last week, Mr. P. C. Cowan, Chief Engineering Inspector to the Local Government Board, opened an inquiry, in the boardroom of the Richmond Asylum, into an application for an extension of the amount estimated in connection with the Portrane building arbitration. The Asylum Committee have applied for a further sum of £2,000, to enable them to defray the expenses incurred in connection with the arbitration proceedings, recently terminated, in reference to the buildings at Portrane Asylum.

Mr. Gerald Horan (instructed by Mr. Dillon) represented the Joint Committee.

Mr. A. Murray (instructed by Mr. Good) appeared for Messrs. Collen, Brothers, contractors.

Mr. Horan explained the object of the inquiry, and in doing so said that the amount sought was the balance of a loan of £12,500, for which the Committee applied to the Local Government Board on the 22nd January last. Of that application the Local Government Board sanctioned a sum of £10,500, but asked that inquiry should be made as to the reason for the granting of the remaining £2,000. That sum, counsel explained, was made up mostly of expenses incurred in connection with an arbitration as to the extras claimed by Messrs. Collen Bros., building contractors, arising out of the works executed by them for the Committee at Portrane Asylum. That arbitration took place in March, 1905, and lasted thirty-five days. In August, 1905, the arbitrator, Sir Thomas Drew, gave his award, which allowed Messrs. Collen Bros. the full sum of the net balance due to them, £10,108 19s. 7d., in respect of their claim. Counsel went, in detail, into the expenses of the arbitration, amounting to £1,781 odd—the Joint Committee's costs and expenses. There was a sum of £158 for arbitrator's fees, it having been agreed that each party to the arbitration should bear half the arbitrator's fees. Other items were—£187 for building surveyor's fees, and £38 7s. 3d. for law costs, and a further sum for law costs of £400, and architect's fees for attendance; and his percentage on the award amounted to £662 13s. 6d.

The Asylum accounts dealing with the arbitration expenses were then laid before the Inspector by Mr. Doyle, accountant, who explained the several items therein contained. He said that the accounts for which the Committee were responsible included arbitrator's fees, which were £158; quantity surveyor's fees, £187 8s. 6d.; law costs, £421 9s.; architect's fees, £404 6s. 4d.; expenses in connection with the arbitration, £258 7s. 6d.; fees to Messrs. Patterson and Kempster, £317 13s. 10d.; expenses of preparing evidence, etc., £395 12s. 2d.; Mr. Mitchell's fees, £200; and several smaller sums.

To the Inspector.—The sum of £12,500 originally applied for would, he considered, more than satisfy the Committee's needs in the matter. The total amount required to meet the contract and expenses of arbitration was £12,372.

The Committee of Management admitted that there was a sum of £830 due to Messrs. Collen for work done, with which the arbitrator had not dealt owing to an error in the preparation of the account, by which that sum was left out of the total bill of quantities.

Mr. R. Jones, J.P. (Chairman of the Committee), said that the Committee, which he was there to represent, did not know of the error of £830 until the arbitration had commenced.

The Inspector pointed out that the building had cost the Committee more in every respect than had been anticipated.

Mr. Jones said that was so.

This closed the inquiry.

**The Law of Light and Air.**

In the Chancery Division, Mr. Justice Barton recently gave judgment in the case of Black v. Scottish Insurance Co., Ltd., in which the plaintiff, a clothing manufacturer, claimed an injunction against the defendants for the erection of a building at the corner of Bedford-street and Donegall-square, which, it was contended, obstructed the ancient lights of plaintiff's factory, warehouse, and cutting rooms at the north side of James-street, South, and for permitting to remain any building already erected which would cause such obstruction, and also for damages. The company had expended about £64,000 on the erection of the building in question. They denied that it interfered with the plaintiff's light, and asserted that there was sufficient light through the plaintiff's windows for ordinary trade purposes.

Mr. Justice Barton, in delivering judgment, said the rule of the law in these cases laid it down that the measure of light which the Court was to have regard to was not what was needed for a special requirement, but for the ordinary purposes of inhabitation or business. A plaintiff to succeed in an action for infringement of light must show real injury and not partial inconvenience. The plaintiff in the present case turned out 120,000 suits a year, 75 per cent. of his trade being in juvenile suits of navy blue. His patterns and material had to be compared at all stages of manufacture, and this kind of work required a northern light, and the lights interfered with were northern lights. In the manufacturing part of Belfast no linen or woollen factory was complete without accommodation for examining goods. The obstruction complained of was lateral and from a wall built of red brick, and evidence was submitted that it might be innocuous if faced with white brick. However, the question of the colour of the bricks was only one of the elements in the case, coupled with the great height and close proximity. Defendant's witnesses admitted that an examining-room was necessary for the business, and before the building in question was erected the room was adapted to its purpose. There was a large body of evidence which forced him to the conclusion that it was now practically useless for such purposes. It was impossible to say whether, and, if so, how far, the result might have been obviated if the wall had been built of white brick, or if it were kept effectively whitewashed. Be that as it might, his Lordship said he could not resist a large body of evidence that the new building had rendered the room practically useless for its appropriate purposes. On this part of the case very interesting evidence was given that a person working at the window of the room was rendered practically colour-blind for the purpose of matching blue cloth owing to the red rays from the brick wall.

The case, however, did not depend entirely on the evidence of experts, but also on that of a considerable number of independent business men. While coming to the opinion that plaintiff had exaggerated the damage he had sustained in putting it at £1,000, his Lordship was forced to the conclusion, on the whole case, that the defendants' building had been proved to be an actionable nuisance. He would not, however, make any decree in the form of a mandatory injunction to pull down the building, although that was the form he ought to adopt if he were satisfied that the nuisance could not be obviated. The decree would be in the form of restraining the defendants from keeping erected the building so as to create a nuisance. That would leave it open to them to obviate the nuisance if they could. After that, of course, there would be liberty for both sides to apply as they might be advised.

**Main Drainage Contract.**

In the Court of Appeal on Monday, before the Lord Chancellor, Lord Justice Fitzgibbon, and Lord Justice Holmes, the case of Pearson v. Corporation of Dublin was opened. The action is by Messrs. Pearson, of Victoria Street, London, against the Corporation of Dublin, to recover £36,000 for work done in connection with the contract for the erection of precipitation tanks at the Pigeon House Fort, for the Main Drainage Scheme. The contract price was £94,000, but the plaintiffs had to do extra works, involving the additional cost now sued for, and they alleged that they were induced to enter into the contract at £94,000, by misrepresentation as to the depth of the harbour wall, it being reported to be 9 ft. below Ordnance datum, whereas, as a matter of fact, it was practically coincident with Ordnance datum. The defendants denied that there was any misrepresentation, and made the case that the plaintiffs were bound by the contract, the full particulars of which, they alleged, were within their knowledge at the time of entering into it. The full amount of the original contract price had been paid. On the hearing of the action before the Lord Chief Baron and a special jury, the Lord Chief Baron, at the close of the plaintiff's case, directed a verdict for the defendants. On application by the plaintiffs to the King's Bench Division, that Court, the Lord Chief Justice dissenting, held that the Lord Chief Baron was wrong, and directed a verdict to be entered for the plaintiffs with costs of the trial and argument. From that decision the defendants now appealed.

Mr. Sergeant Dodd, Mr. Charles O'Connor, K.C.; Mr. Ignatius O'Brien, K.C.; and Mr. Philip White (instructed by Mr. Ignatius Rice) appeared for the Corporation (appellants). The Right Hon. J. H. Campbell, K.C.; Mr. John Gordon, K.C.; Mr. T. M. Healy, K.C.; and Mr. E. A. Collins (instructed by Mr. George Collins—Messrs. Casey and Clay) appeared for Messrs. Pearson (respondents).

Mr. Sergeant Dodd opened the appeal, and described the plans the works carried out by the plaintiffs, and the position of the wall which had given rise to the action.

Lord Justice Holmes observed that anyone looking a

the dotted line would come to the conclusion that there was something there, and that there was some reason for putting it there.

Sergeant Dodd said he was not going to argue that on the plan there was not a question to go to a jury as to whether there was not a wall existing there. Counsel then read the evidence given at the trial.

The case was still at hearing at the time of going to press.

#### MINERAL LITHOFALT ASPHALTE PAVING.

In the many large areas in London and the provinces and other cities, particularly amongst the poorer districts, in narrow streets, courts and alleys, are practically the playgrounds of the children. To meet this want the Limmer Asphalt Paving Company, Ltd., have introduced a new patented material, registered and known as Lithofalt, which is now largely and increasingly used in London, the provinces, and the Colonies, and is equally suitable for paving streets of light traffic, and is able to stand the extremes of heat and cold. Mineral Lithofalt Asphalt is neither more nor less than a carpet to withstand the wear and tear of the traffic, and under no circumstances should it be permitted to be laid till the concrete foundation is perfectly dry, as there would be a risk of failure by sealing down the dampness between the concrete surface and the Mineral Lithofalt Asphalt.

Mineral Lithofalt Asphalt has great advantages over the ordinary macadam, tar macadam, wood paving, and the noisy stone setts. It is a pre-eminently sound and sanitary paving, impervious to moisture, and easily and quickly cleaned, is durable, quickly and easily laid or repaired, thus causing little or no inconvenience to traffic. It is comparatively noiseless, and admits of great ease of traction, there being a minimum of vibration. It prevents the accumulation of dust and dirt, and its value is greatly enhanced by its durability and elasticity and its ability to withstand the extremes of heat and cold. Being non-absorbent, it can be easily flushed with water and so kept perfectly clean. It is estimated that where four loads of mud or dirt are taken from a macadam surface, one load is taken from a granite sett pavement, one-third of a load from a wood pavement, but only one-eighth of a load from rock asphalt or Lithofalt paving.

A considerable quantity of Mineral Lithofalt Asphalt has been laid in London for the Lambeth, Poplar, Camberwell, Shoreditch, Paddington, and Hampstead Borough Councils, and over 7,000 yards of 1-inch paving for the new machine shop floors for Messrs. Vickers, Son and Maxim, and over 2,500 yards for Messrs. Henley's Telegraph Works Co., Ltd., at Gravesend; some 7,000 yards for the North of Ireland Paper Mills Co. at Ballyclare, and 2,500 yards for the East Lancashire Paper Mills Co. near Manchester; also for the Belfast Corporation, bridges, footways, etc., and for the Edinburgh Town Council at Portobello.

In addition, the Limmer Asphalt Paving Co., Ltd., have recently received an order to lay in one of the largest warehouses in Glasgow six floors, covering 16,000 yards, with 1-inch Mineral Lithofalt Asphalt.

#### COAST EROSION.

A practical movement is now on foot with the object of inducing the Government to introduce into Parliament a Bill confirming the responsibility of the Crown to protect the sea coast of this country and to afford assistance to local authorities in the construction and maintenance of coast protection works. The movement in question originated in the conference held recently in Westminster, when the representatives of various municipal and other councils were present. It certainly is the statutory prerogative and the duty of the Crown to protect the land from inundation for the benefit of the commonwealth, and, as a matter of fact, no obligation rests upon anyone else. Moreover, local authorities do not appear to have power to execute protection works unless they also happen to be the owners of the threatened land. We know the difficulty of the problem is largely to be found in the small value of land along the coast except in the vicinity of towns, but the case of those living near the sea is somewhat hard, as the cost of the necessary works is positively prohibitive in some places, and in others involves exceedingly heavy burdens in the way of taxation. The most unfortunate thing of all is the unrestricted removal of beach material, a habit in which Government departments are among the worst offenders. This suicidal practice should certainly be stopped at once, however indisposed the Government may be to fall in with larger views as to their responsibilities.—*The Builder*.

#### ARCHITECTURAL PROGRESS IN ENGLAND.

The annual report of the Council of the Royal Institute of British Architects records a number of very interesting matters. Examinations were held in Melbourne, Sydney, and Toronto. Steps have been taken to procure a site for erecting worthy premises on.

The Council mention that "feeling it to be a matter of vital importance that the County Hall which the London County Council propose to erect on the south side of the Thames, at a cost of £1,000,000, should be a building worthy of the greatest city in the world, they addressed, last July, a letter to the London County Council, in which they offered the assistance of the Institute in their efforts to secure a design for such a building. The Establishment Committee of the London County Council having intimated their desire to receive the suggestions of the Institute, the Council, after obtaining the report of a special Committee on the subject, have advised them to institute a combined open and invited competition, to be judged by a jury of Assessors."

The report goes on to deal with the vitally important subject of Statutory Registration, and the records that the Registration Committee, as existing at the time of the issue of the last annual report, drafted a Bill and issued a report, which have both been printed in the *Journal*. The Registration Committee, as constituted after the elections in June last year, appointed a sub-committee "to take evidence for and against the principle of Registration, and to suggest the course of procedure to be adopted at the general meeting, when the present scheme of Registration comes up for discussion." The sub-committee sat almost weekly for the purpose set forth in the reference, and took the evidence of twenty-four witnesses from London and the provinces. The Registration Committee, after having all the evidence before them, submitted a report to the General Body at a special general meeting held on Tuesday, 3rd April, and the resolutions then proposed were adopted unanimously.

These are the proposals which we have already commented upon, and which we think ought to be strenuously resisted. The report also refers to the recent blackballing of a number of candidates nominated by the Council for fellowship, who, having been found eligible from their work and position were nominated for membership. Twenty-eight candidates were nominated for election at the Business Meeting of the 5th March, of whom six were Associates. A poll was demanded by private members of the Institute, and resulted in the rejection of the twenty-two non-Associate candidates. As most of these non-elected candidates are by their age and position precluded from sitting for an examination, they are thus debarred from membership. The Council cannot but regard such a result as unjust to candidates and most detrimental to the interests of the Institute.

We are glad to see that the Council has no hesitation in describing this course of action as harmful to the best interests of the Institute.

Sir Aston Webb having retired from the competition for the Carnegie Foundation, "The Palace of Peace," at the Hague, Mr. H. T. Hare has been invited by the Hague Committee to represent Great Britain in his stead. The President, Mr. John Belcher, is the other British representative.

The Council has given a grant of £500 towards the International Congress, and the Council of the Society of Architects one of £100.

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## THE EFFECTS OF EXTRACTING RESIN FROM TREES ON THE TIMBER.

In the current issue of the "Commercial Compendium," there appears an excellent article giving the results of certain investigations made for the purpose of ascertaining what effect, if any, had the bleeding or tapping of trees for resin and turpentine upon the quality of the timber. In view of the increasing difficulty of obtaining timber of the highest quality, such as forty or fifty, and even twenty years ago, was regularly imported, anything that throws light upon timber growth and treatment is valuable; besides this, the turpentine industry is a vast one, and of considerable interest to builders and others, who employ it in painting work. The "Commercial Compendium" tells us that "the gathering of resin in the United States dates back to the time of the early settlers in that part of the country which is now North Carolina. From there the industry has extended, and is now carried on in all regions where the long-leaf pine is found in sufficient abundance, and more especially in the South Atlantic and Eastern Gulf States. In addition to the resin and turpentine, the industry includes the manufacture of tar and pitch, the distillation of spirits of turpentine and other by-products. The process in brief is as follows:—The trees are tapped and the sap allowed to flow into receptacles prepared for the purpose. The resin is distilled, and spirits of turpentine and resin are obtained. Tar is obtained by the destructive distillation of the wood itself, and oil of resin, oil

of tar, common pitch, brewers' pitch, etc., are obtained by a redistillation or combination of the above-named products.

We are told further that the resin is obtained from the long-leaf pine, of which there was formerly an unbroken forest in Southern Nigeria, in the Gulf States, and Eastern Texas. What is most serious, however, is to learn that more than half the original forest has been exhausted and that there are no renewals. The centre of the industry is now in Florida, and reaches into Alabama, Mississippi, and Louisiana, and while many large areas are practically untouched, the greater portion of the best forests have had all their best timber removed, while forest fires and the operations of the resin gatherers have depleted the remainder. And our contemporary observes that under the present method, it is only a question of time when the supplies will be entirely exhausted, a very serious state of affairs, and one which seemingly applies to almost all classes of timber. Ireland, for instance, once a timber-growing country—at least, as regards oak—has entirely ceased to provide any timber for the builder or the shipwright. Irish oak has a fine bearing timber, coarser than English, but still capable of use in very fine work, the roof of Westminster Hall, as is generally known, being of Irish oak, some antiquaries contending that it was grown in Co. Carlow, while others hold it to have come from the oak forest which was known to have existed at Oxmantown, Dublin, somewhere near the Bluecoat School, but not a trace of which now remains. The beautiful old Domingo, or Spanish mahogany, used for joinery and cabinet making work during the eighteenth century, particularly the "feathered" variety, with its exquisite markings, has passed out of existence as regards the finest varieties. English oak is increasingly hard to obtain—in fact, simply cannot be obtained in large quantities or scantlings; though on rare occasions standing English oak has been cut for church roofs during recent years. We know of a case in which a few years ago a very large firm had a contract for a quantity of fittings specified to be in English oak. They placed an order in the hands of one of the largest firms of English timber merchants, giving practically *carte blanche* to procure the right thing, but the result was the timber had to be got together here and there and anyhow, the stuff eventually delivered being, for the greater part, quite unfit to be used. Similarly, walnut is becoming scarcer. In the ordinary timbers used in building, the fine old red deal cut out of baulk from the Baltic ports, such as the highest class of Memel, are not now obtainable; in fact, during recent years the quality of red timber obtainable in any sort of scantlings, such as for church roofs, is very inferior, even when carefully picked. The timbers are full of loose and large knots and generally badly shaken. Of course, by a process of elimination it is still possible to get fairly good stuff, but the ordinary market article is as we describe. The result has been to reduce the stock pattern verbiage of the architect's specification to a farce. In consequence pitch pine has of late years come into much more general use, and for bearing purposes is very suitable, but it is an extremely difficult timber to judge, unless to an expert of skill, greater than is usually possessed by the average architect or builder, and consequently treacherous in its behaviour, particularly in framed work, for which purpose it has become, curiously, and, to our mind, most undeservedly, popular in Ireland, for in addition to its treacherous

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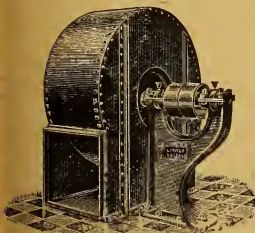
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character, it is a raw, unpleasant-looking wood, for nothing can well be less artistic than stained and varnished pitch-pine sheeting or framing.

Quoting again from our contemporary, we learn that extensive investigations have been carried on in recent years by the United States Department of Agriculture, and very interesting results have been obtained of the mechanical and other properties of pines. As "bleeding" pine trees for the purpose of extracting turpentine and resin has been regarded as injurious to the timber, the Agricultural Department undertook a special investigation involving mechanical tests; physical and chemical analyses were made of the wood of bled and unbled trees from the same locality. The results proved conclusively (1) that bled timber is as strong as unbled if of the same weight; (2) that the weight and shrinkage of the wood is not affected by the bleeding; (3) that bled trees contain practically neither more nor less resin than unbled trees, the loss of resin referring only to the sapwood, and therefore the durability is not affected by the bleeding process. This result was entirely satisfactory, as previously many architects and large consumers, such as railway companies, refused to employ "bled" timber. The rate of growth of pines naturally varies according to the soil conditions in which they occur. Cuban pine grows about 22 feet in 10 years, about 58 feet in 25 years, about 83 feet in 50 years, about 95 feet in 75 years, and about 105 feet in 120 years. The diameter growth is as follows:— $2\frac{1}{2}$  inches in 10 years,  $6\frac{1}{2}$  inches in 25 years,  $14\frac{1}{2}$  inches in 50 years, 18 inches in 75 years,  $20\frac{1}{2}$  inches in 100 years, and  $22\frac{1}{2}$  inches in 120 years.

In one year alone 3 per cent. of the stand of timber was cut, while the yellow pine supply threatens to become exhausted in 33 years at the present rate of consumption. From these facts, it would seem that the world's timber supply is rapidly approaching a state which may be described as threatening, and it seems to be equally clearly the duty of the Governments concerned to take better measures for reforestation.

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## COMMENTS.

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### The San Francisco Earthquake.

Not for generations past has any sensation so impressed the public mind as the awful catastrophe of earthquake and fire which has devastated San Francisco. The actual loss of life has, everything considered, proved comparatively small, but the terror, distress, and want have been awful. The loss of property totals to the value of many millions sterling, and the British Fire Insurance Companies have suffered heavily. San Francisco as a great city is the growth of a few generations; fifty years ago it was an insignificant place; the day of the earthquake it had become one of the most beautiful cities in America. As a consequence of its rapid growth, practically all the buildings were modern, with the exception of a few relics of the old days when Spain possessed a great American Empire, and her missionaries established themselves over South America and the Pacific Coast. A steel engraved map before us, contained in an atlas published by C. Smith, 172 Strand, London, in 1827, indicates the sparse fashion in which California was then sprinkled with towns, and San Francisco is simply shown as one of such settlements, all endowed with

Spanish names. The population of San Francisco had reached about 350,000, and the city was rapidly increasing in wealth, beauty, and in population when the catastrophe occurred. The old Spanish churches and convents are of exceedingly simple, but interesting, character, a sort of modification of Spanish renaissance modified to suit the small requirements, the scant supply of skilled labour, and other resources of older countries. The old buildings are looked upon by Americans nowadays much as we regard the remains of the middle ages, for they are all that the Americans have in the way of historic architectural remains. In the New England and Southern States, of course, there are numerous and very beautiful examples of what is called the "Colonial style," which is simply English Georgian work dating from the time when the United States were British Colonies, and our readers may remember we some two years ago reviewed a very fine illustrated work published by the "American Architect" on "Colonial Architecture." California has, of course, no such work, and her antiquities are confined to the mission remains. Many of the features of old mission buildings have been imitated, and a sort of style, known as the "Mission Style," evolved; but it has never reached serious proportions. The principal buildings of San Francisco might roughly be divided into three classes—(1) Frame buildings of timber, which, we believe, mostly date back to the days of the Californian gold fever about 1847 and a few subsequent years, when San Francisco first began to really grow in importance; (2) ordinary structures of brick and stone: to this class belonged many important public buildings, the greater portion of the city, including the business section, as well as the numerous palatial villas and mansions for which San Francisco was famous, though a good many very fine timber-framed mansions also existed; (3) the modern steel-framed buildings. As might be expected, these latter were exceedingly numerous, and included many skyscrapers. Wherever the buildings of the first two classes were touched by the earthquake they seem to have collapsed like the proverbial house of cards, and the only buildings which seem to have stood the shock in any measure were the steel-framed structures. San Francisco had previous and serious acquaintance with earthquakes, and many of the giant structures were the result of some considerable study and calculated to resist ordinary shocks of earthquake. As an invariable rule the foundations are of reinforced concrete-steel, with fifty foot concrete piles driven down to a hard bottom, the superstructure, well anchored to the foundation, being a steel frame work, the upper sections filled in with brick or concrete, the lower storeys weighted with heavy granite or other stone construction. Many of these buildings collapsed, but a good many seem to have escaped. The Palace Hotel was especially laid out upon these lines. The whole framework was so framed, braced, bolted, and riveted together as to allow a certain amount of play or elasticity as to come back again in case of rocking. The Palace Hotel seems to have resisted the earthquake shocks as well as was possible for any structure from the hand of man to do; but the subsequent fire has destroyed the opportunity of obtaining some interesting and valuable facts as to the behaviour of such structures and the after effects of the shocks. It is said that practically speaking the Palace Hotel came through the ordeal without serious damage. Lofty chimney stacks, as is well known, sway from the per-

pendicular in a storm, and owe their safety to their resiliency; and so, too, in a lesser degree, must a church spire have a certain element of elasticity, or its thin hollow shell, only nine or ten inches thick, would snap in two; the tall cross or weather cock on a spire likewise is never fixed perfectly rigid, the "tail" being given a certain amount of play, the mediæval method being to drop the tail of the cross loose through the apex of the spire and weight it inside with a big stone tied to its tail. A characteristic example of tall steel factory chimney may be seen in the twin chimneys at the Ringsend power station of the Dublin Tramways Company, which are of American design and construction.

The San Franciscans, with characteristic American energy and enterprise, are already setting about rebuilding their once beautiful city, and doubtless even still, despite fire and shock, many valuable lessons as to the method of construction best calculated to resist shock may be gleaned from the ruins; everything, however, seems to point to elastic steel framing, especially well braced together and anchored at the base, as the ideal method, though, indeed, it is doubtful whether it will be possible at all to design structures capable of resisting entirely without damage such an abnormal shock as the recent one, when the ground, it is said, rose and fell as much as from 6 to 10 feet.

#### Arbitration.

The virtue of arbitration as a safe, cheap, and speedy method of disposing of differences in a friendly fashion is admitted from time immemorial. It is in one form or another as old as Holy Writ; but, unhappily, in practice in these days it is not always so cheap, so final, or so time-saving as might be desired. We publish elsewhere a brief report of the inquiry ordered by the Local Government Board into the question of the costs incurred in the recent arbitration between the Joint Committee of the Portrane Asylum and Messrs. Collen Bros., the contractors, in which it was shown that, despite the most favourable conditions, arbitration is a costly mode of settling differences, and that even when the decision is good law, final arbitration is not altogether inexpensive. It was generally admitted that no better or more painstaking arbitrator could have been secured. Yet the costs in a total claim of £10,000 amounted to £2,000. A big bar of counsel was employed and a host of expert witnesses examined, and, properly enough, had to be paid adequate fees.

Another point of interest was that which showed how easily mistakes arise in measurement accounts. Although one of the ablest building surveyors in the profession was engaged in the preparation of the accounts, a mistake of £800 against the contractors cropped up, which error was not discovered until the arbitration proceedings had commenced. Happily, in this case both parties united in loyally abiding the award, but this is not always so, and it seems to us but one more instance proving the unsatisfactory character of arbitration as a substitute for law, unless previous steps are taken to ensure that the arbitration shall be rapid, informal, and final. Arbitration is of utility only when the parties can agree to submit their differences to the final and arbitrary decision of some one competent man, who should be named before the contract is entered into in a purely friendly fashion—never otherwise. Proceedings outside these lines lack the qualities of cheapness and rapidity, and even the finality and authority of legal decision.

In an able letter on another question published in this

issue, Mr. D. W. Morris touches upon this point, and notes the great utility of the French Courts of first instance, in which, by agreement, cheap and speedy justice may be obtained in matters of commercial or building disputes. We ourselves have frequently in these columns urged the establishment of a court presided over by an officer or judge of the status of Master in the High Court, who should have jurisdiction to decide cases of commercial equity, including building and engineering disputes, if necessary only by agreement or consent. We think parties should have opportunity to institute such proceedings before such an officer, and then the defendants or respondents should have full liberty to have such cases remitted for trial by the ordinary courts of law. Such preliminary procedure would have much to commend it. It would save the litigants from great expense and amateurish blunders of ordinary arbitration, and, if they so willed, avoidance of the heavy cost of an action in the High Courts, all without abrogation of the functions of the present courts of common law and equity.

Under the present law, the only way to make arbitration cheap and effective is to decide and agree upon one single arbitrator before the contract is entered upon, and not after the dispute has arisen, and to agree further that his decision shall be absolutely final.

#### Irish Labour v. English.

In his examination before the Lunacy Commission, which lately sat in Dublin, Mr. J. W. Gardner, consulting architect to the Inspectors of Lunatics in Ireland, gave evidence, and made some remarkable statements, which, if true, go a long way towards explaining the present unsatisfactory condition of building enterprise in Ireland. Stripped of all detail or verbiage, Mr. Gardner's evidence was, that Irish workmen did less work per day than Englishmen, and he instanced in particular the bricklayers, saving that the Englishmen laid 1,000 bricks per day, while the Irishmen only laid 250, that being, he added, the limit laid down by the trades unions. That Mr. Gardner's statement sets forth the view of the man in the street is beyond doubt. Equally so is it plain that building is too dear in Ireland; that many persons who would build, if building could be cheaply accomplished, dread to embark upon a scheme of bricks and mortar. Yet there is, on the other hand, no doubt that English employers complain much more vigorously of their employees than do Irish employers. We ourselves have some practical experience of these matters, yet we should feel hesitant to pronounce off-hand whether Mr. Gardner's statements are absolutely accurate or not. This, however, we do know; that beyond yea or nav, building in Ireland, especially in and around Dublin, ought to be cheaper than it is. Equally we know, that except in foundations, English bricklayers do not habitually lay 1,000 bricks per day, and where 1,000 bricks per day are laid, it is alleged that they are practically "thrown together." In country districts in Ireland you can, moreover, get a small or medium-sized house built quite as cheaply as anywhere else. The trade unions say contra to Mr. Gardner, that their members do not idle, that they are as good and as hard workers as the Englishmen, and at a recent meeting of the Trades Council a resolution was passed characterising as absolutely unwarranted the statements made by Mr. Gardner in his evidence before the Lunacy Commission, "because he gave preference to English workmen without any details." Still, Mr. Gardner's view, rightly or wrongly, represents the view of the general public.



We believe that the truth is that, unfortunately, there is only too much foundation for Mr. Gardner's statements, though it is another question whether matters are altogether quite as bad as he described when Mr. Chadwick Healey, one of the Commissioners, asked him whether, in respect of an asylum building contract, which worked out at £100 per bed, if it could not be done cheaper in England.

Mr. Gardner—Yes, you get far more work out of an English workman than out of an Irish workman.

Mr. Healey—Any other reason? Yes, materials are cheaper in England. In Ireland, you see, a bricklayer is bound down to lay no more than 250 bricks a day, whereas in England I often had men laying 1,000 bricks a day.

When was that?—In 1882.

Isn't the average in England 300 or so now?—500 is about the average, I know. You pay higher wages in England, but you get more work in proportion.

The statements are rather sweeping, and there is too much generalisation about them; but it is not for the purpose of emphasising what Mr. Gardner said, or of making comparisons, that we write. The matter is one that closely affects all of us, architects, engineers, builders, surveyors, and artisans alike; and the sooner the latter recognise this fact the better for themselves. The statements we have quoted, strong as they are, are but the echo of what is being said in private conversation every day of the week. This mere denial by the Trades Council will not remove the firmly fixed impression from the mind of the public.

Having seen that, it would be to the interest of all concerned that this matter should be cleared up once for all, and the public shown that there is a genuine disposition upon the part of those whose business it is to build or to design to give honest value for their pay. This result might be accomplished by the appointment of a private commission of inquiry. The matter, important as it is, is of too academic and abstract a character to call for the interference of Government, but if all concerned were honest in their desire to get at the true facts, the difficulty about an inquiry could easily be overcome. The presidents of the Institute of Architects, the Master Builders, and the Trades Council might each be asked to nominate a couple of persons of temperate mind, sound judgment, and practical acquaintance with the point at issue; and, if it were thought desirable, some independent gentleman not identified with any of these interests might be agreed upon as chairman. There are plenty of men in Dublin well qualified to act upon such a commission of inquiry, and to give an honest, upright verdict. The commission might not result in an immediate revolution, but it would go a long way towards clearing the air. Before it, persons holding like views with Mr. Gardner might make their charges, before, amongst others, two or three commissioners representative of those against whom the reflection is made; rebutting evidence could then be put forward, and some really reliable facts obtained as to what actually is being done in other countries. The result would be that we should get a pronouncement either that there was some foundation at least for these charges, and, if so, surely it would be to the plain advantage of all concerned to seek out a remedy, and we might hope for some practical suggestions to this end from the Commission. On the other hand, if the commission were satisfied on the evidence that there were no substantial grounds for such sweeping assertions,

then we should get a very definite and unmistakable pronouncement to that effect. This would greatly tend to remove the present impression from the mind of the public, and would also demonstrate that we must seek elsewhere for the causes of the excessive cost of building in Dublin.

#### A City of Architectural Scraps.

The extraordinary want of dignity in its public buildings that strikes a foreigner as the most notable characteristic of London is trenchantly set forth in a recent number of the "American Architect." It is perfectly true that London buildings lack their fine adjuncts, but it is equally true that it possesses a few great buildings such as no city in America has. America, for instance, has no counterpart to Greenwich Hospital, or to the superb river front of Somerset House, while a city possessing churches so grand and so interesting in variety of detail, though wide as the Poles apart in style, as Westminster Abbey, St. Paul's and the new R.C. Cathedral, Westminster, can never be uninteresting. Unquestionably, the two buildings we have specially noted stand upon a plane apart, for they rank amongst the finest buildings extant.

Criticising new buildings in London, the "American Architect," says:—"The new War Office has lost its outer garment of scaffolding, and we may now examine it. Curious it is that, in spite of half a century's ridicule lavished upon the dome and "pepper-boxes" of the National Gallery, that same style of architecture should return to us. The new Admiralty rejoices in a dome—St. Paul's in miniature—and pepper-boxes; the new War Office has only the latter, two-storeyed square turrets upon the circular base of the rounded corners of the building. The principal doorway is mean; the "ornament" in the semi-circular pediment, the Royal arms! A row of columns upon the first storey is presumably an effort to bring the new work into harmony with Inigo Jones's fine fragment hard by. Now may we not wonder why Jones's plans for Whitehall Palace were not utilised, at all events for the façade? Surely the interior of the building might have been adapted to modern uses? It is a pity. The Banqueting Hall stands out nobly as a dignified building—grand in its simplicity.

With the exception of the Foreign and Home Offices, which are also excellent specimens of simple dignity, the whole of the Whitehall buildings leave London where it was—a city of mere scraps architecturally. Along the Strand hoardings still prevail. We wander up a street named Aldwych, between desert wastes. The Crescent is but a roadway. The Gladstone Memorial is jammed against Wren's old church of St. Clement Danes, presumably that it may not be in the way of cars and omnibuses. The Church of St. Mary-le-Strand is divested of so much pavement that it seems to have been shaved off on each side. A few trees would correct this; but trees would interfere with traffic. Alas, will the improvement of London never be a properly organised scheme? Paris years ago determined how to develop itself; London is all haphazard—tinkering; it is characteristic of the British race. In France everything is a well-studied organisation; in England, the last new idea of the newest in office, just what may be best for the time being. However, after foreign travel, all Englishmen and women rejoice when they return to their haphazard manners of luggage management. In France, everywhere on the Continent, half an hour often does not suffice for claiming luggage. Here it is chucked out of a van, we poke it with our umbrellas, a porter picks it up, it is lifted into a cab, and off we go in three minutes! And the marvel is we never lose it—we may miss it, but it always turns up. Blessed methodless land! But luggage is not architecture.

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**Belfast.**—The tender of Messrs. J. and W. Stewart, Belfast and Dublin, for the erection of the New Pumping Station, has been accepted by the Corporation.

**Bray.**—**ARTISANS' DWELLINGS.**—The Local Government Board having sanctioned the loan of £6,000, which the Bray Urban Council propose to expend in the execution of the third, or Purcell's Field, portion of the scheme of artisans' dwellings in the township, the Urban Council have resolved to advertise for tenders.

**Ballinrobe.**—The Board of Guardians of Ballinrobe Union will, on Monday, 21st May, consider tenders for converting a portion of No. 1 ward in the Infirmary into a room to be used as an operating room for the Medical Officer.

**Claremorris.**—Tenders are invited for completing the carpentry and plastering of a new house near Claremorris.

**Dublin.**—**NEW CITY TECHNICAL SCHOOLS.**—At a recent meeting of the Dublin Corporation a claim for the Dublin architects was made by Alderman Kelly, who moved the adoption of the report of the Technical Education Committee, in reference to the selection of an architect for the proposed new technical schools in Bolton-street, and asking for the suspension of the Standing Orders with a view to seeking competitive designs. Alderman Doyle, who seconded the proposition, thought some explanation of the delay should be forthcoming. An amendment was moved by Alderman Irwin that the work should be entrusted to the City Architect, and Mr. Cox seconded, but the Lord Mayor ruled the matter out of order, as the Standing Orders had not been complied with.

The late Miss Eliza Barber, who died on the 31st March, at 24 Preston-street, Brighton, has bequeathed, amongst numerous other charitable bequests, the sum of £5,000 to the Meath Hospital, for a new ward, to be called the "Eliza Barber Ward," and £6,000 for building a convalescent home and providing superior comforts for the poor in Dublin.

**Galway.**—The local clergy and others have under consideration a project for the advancement of the Claddagh, and it is proposed to erect a public hall, which will include a school of industry, with a library and concert room for the little fishing village.

**Gorey.**—The Board of Guardians will, on the 26th of May, receive tenders for the following works to be executed at the workhouse:—At Fever Hospital—To convert the old bathroom into a bedroom, and to erect a new bathroom instead, and the lime-washing of all the walls and ceilings of all the wards and staircase. At Infirmary—To take out 46 old windows and to replace them with new windows in accordance with specification. To plaster the entire walls of two wards and two day rooms and passages on the ground floor of the Infirmary according to specification.

**Inchicore.**—Mr. Arthur Chamberlain, in company with several members of the Board of Kynoch, Limited, recently visited Dublin and inspected their paper mills at Inchicore, where, encouraged by the support of the wholesale stationers throughout Ireland, extensive alterations and additions are contemplated.

**Mullingar.**—Tenders are invited on 21st May, for the building of a dwellinghouse and shop at Dysart, Mullingar, for Mr. Coffey, according to plans and specification which can be seen at the office of J. F. Robins, Moate.

**Naas.**—Tenders are invited for erection of warrerooms and additions to Mr. Foyne's premises, at 12 Main-street, Naas, under the supervision of Mr. J. J. Inglis, C.E. Plans and specifications may be seen at above address, or at 18 Nassau-street, Dublin.

**Newry.**—A new Foresters' Hall is in course of erection in Needham-place. The design is neat and ornate, and will add considerably to the appearance of the thoroughfare where it is being built. The total cost of the building will be £1,740, and when in the course of time the other portion is proceeded with it will mean at least £1,900 extra. Mr. John Brown is to be

complimented on the use he has made of the space at his disposal, and on the chaste appearance the facade will present. The builder is Mr. James Hughes, and in his capable hands may safely be left the execution of the work.

**Navan.**—The Council of the Navan Urban District invite tenders for erecting fourteen two-story cottages on the Kells road, Navan, in accordance with plans and specification prepared by R. Barnes, A.C.M., Inst. C.E.S.

**Omagh.**—Tenders have been received for carrying out alterations at Urban Council premises for the Omagh Technical Instruction Committee.

**Rathdrum.**—**RATHDRUM UNION.**—The Board of Guardians of Rathdrum Union received tenders for supplying and putting up shelves, presses, and other fittings in the Dunganstown Dispensary.

**Sologhead.**—Tenders are invited by the Managing Committee of the Sologhead Co-operative Agricultural and Dairy Society, Ltd., for the erection and completion of a manager's residence and offices, according to plans and specification prepared by John B. Kirby, C.E., Architect, Tipperary. Tenders to be lodged on Monday, 21st May.

**Strabane.**—The County Council of Co. Tyrone invite tenders for the following works:—To provide and fix ventilators and washstands in Strabane Courthouse, widen the bench, with corresponding alterations in the table, etc., and re-set the gas lights; to carry out the recommendations of the Omagh Courthouse Committee. Tenders must be lodged on 5th June.

**Waterford.**—In our advertising columns to-day the Technical Instruction Committee of the Co. Borough of Waterford invite tenders for the furnishing of the chemical laboratory at the Waterford Central Technical School. All particulars can be had on application to Mr. J. J. Fleming, C.E., 44 Lady-lane, Waterford.

#### SIMPLEX CONCRETE PILING.

We understand that Messrs. J. Crosfield and Sons, Ltd., the large soap manufacturers, have arranged with the sole licensees, Messrs. J. and W. Stewart, for this piling for an addition to their Works at Warrington.

We also learn that Messrs. J. and W. Stewart have secured a further contract from Messrs. Cammel, Laird and Co., Ltd., for foundations for machinery at their new works. This is the second contract that Messrs. Cammel, Laird and Co., Ltd., have entrusted to them.

Messrs. Archibald Constable and Co. will publish very shortly a new book by Professor Harry C. Jones, of the John Hopkins' University, entitled "The Electrical Theory of Matter and Radio-Activity." Professor Jones reviews the whole subject, and brings into line the latest results obtained.

**Macroom.**—The Rural District Council will, on 2nd June, appoint an engineer to do all the engineering work of the rural district, at a salary of £40 per annum. The person appointed to the position must also undertake to superintend for the Council the completion of Scheme V. and VI. under the Labourers' Acts at present in progress in the rural district, for the sum of £30, and shall also act as engineer to do all engineering work required to be done by the Macroom Board of Guardians, at a salary of £20 per year.

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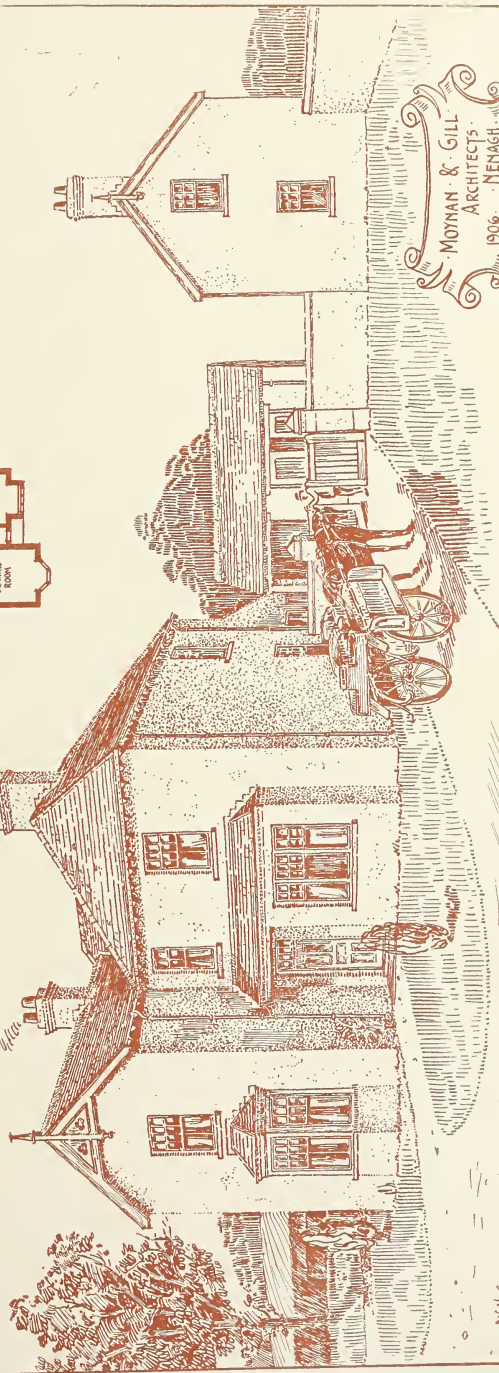
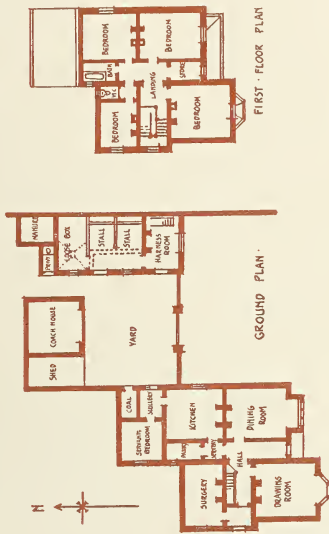
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# ENGINEERING SECTION.

## THE USE AND CARE OF CHAINS.

"Look to your chains" is a phrase which every engineer in charge of a quayside, wharf, or workshop, does well to bear constantly in mind. The life of the workman is often at the mercy of a defective link, worn by too long use or want of lubrication, and overlooked through careless supervision. We are reminded of these facts by a recent reprint of a paper, read some time ago, by Mr. Henry Adams, M.Inst.C.E., before the Society of Civil and Mechanical Engineers, the information contained in which is most serviceable as a warning to a factory engineer of one of his most important duties. The author was responsible for the use of some 7,000 fathoms of 9-16th inch crane chain, and his description of the method which he proved to be the most suitable for securing long life and efficiency, is of much interest. The chains were chiefly obtained from Messrs. Moser and Sons, Southwark, and have in ten years lifted 15,000,000 tons of coal from ships' holds and transferred it to trucks and barges. About twenty new chains, 200 feet long, are required each year, the new and repaired chains in stock ready for use numbering thirteen, and fifteen are usually awaiting repair. When a new chain is put on a crane it is worked for nine or ten weeks, then examined in place, and either taken off or continued in work for another three weeks. It is then removed from the crane, passed over a wood fire to burn off the oil and anneal the chain, is carefully examined link by link over the blacksmith's anvil, and is usually found to be slightly worn at the end working over the jib head. If otherwise in good order it is turned end to end and put in work for a further spell of eight weeks, at the end of which time it is examined in place, and either taken off or continued in use for two to four weeks longer. It is again removed, put through a wood fire again and closely tested; about 44 feet has probably then to be cut off the outer end and another piece added to make up the length. The repaired chain is then put on for six weeks, examined in place, and, if in order, is allowed to remain another one or two weeks. It is then taken off, burnt, examined, and put together in three or four pieces to go four weeks, after which it is removed, burnt, examined and the good parts, if any, cut out for repairing other chains. If the worst link measure in its smallest part  $\frac{1}{16}$  in. full it would only be called a three-weeks' chain,  $\frac{1}{8}$  in. base, a two-weeks' chain, and a reduction of 10 per cent. on the original substance would lead to condemnation as useless. By such systematic treatment the chains will last in constant work from six to nine months, and before being abandoned will raise from 50,000 to 100,000 tons of coal. It should always be borne in mind that the best part of a repaired chain is put over the jib head, for if a worn link at the back end should snap, the time the chain takes to run off the drum will afford the men more opportunity to escape from the falling load. Mr. Adams calls particular attention to the necessity for proper lubrication, quoting as an instance of rapid wear, owing to insufficient oiling, the case of a  $\frac{1}{16}$  in. chain in one of the London gas works, which broke after about 6,800 lifts, or only a tenth part of what it should have done. The oiling should not be executed with an oil-can, it is both an expensive and inefficient method; the lubricant should be applied at least weekly, with a brush, which both assists in clearing the chain and exposing its condition to view. A new chain, or one which has been annealed, should be well oiled with the brush upon a clean floor, and never upon earth or gravel, so that the oil may be worked well into the links.

The author, within the limits of the short paper, also considers various varieties of chain, and the advantages of the short link chain over the common oval link, and also describes the two classes of welding, "hammer" and "dolly welding," for the former of which he exhibits a decided pre-

ference. The information as to the strength of chains, patterns of sheaves, and the many practical hints contained in the paper as to the care and use of chains, are well worth study, and make the pamphlet a very useful addition to the engineer's library.

## ITEMS.

At the time of writing, a scheme, the fruition of which has taken fourteen years' continuous work to achieve, is nearing completion. The new Croton dam is intended to add to the water supply of New York City, and the reservoir, when full to the overflow weir, will contain 34,000,000 gallons. This work adds another wonder to the engineering world, the dam by its size alone standing pre-eminent in structures of that class. It is larger than the three chief European dams combined, viz., the Vrynny dam in England, the Furens in France, and the Gileppe in Belgium. The Assouan dam is longer, but it is only 70 feet in height as compared with the 301 feet of the retaining wall at Croton. The comparatively narrow river has now been transformed into a great lake 2,400 feet across at the dam breast, and filling the valley behind it for a distance of twenty miles. In this, the old Croton dam, once regarded as a wonderful achievement, will lie submerged, the top of the wall being more than 30 feet below the new water level.

When the present site was decided on, it was found necessary to sink to solid rock to obtain a safe foundation for the enormous superincumbent mass of masonry. Borings through the surface earth discovered the substratum to be disintegrated rock, and a depth of eighty-five feet had to be excavated to reach the desired starting point for the footings. The length of the dam is 2,400 feet, of which the main wall is 1,400 feet, and the overflow occupies the remainder. The thickness of the wall at its base is 216 feet, tapering to 21 feet at the top, the slope of the inner wall being very slight. One of the greatest difficulties with which the engineers had to contend was the design and construction of the overflow weir. In the early spring floods great blocks of ice, many tons in weight, will be carried down by the volume of water. These will be crushed by falling on a series of rough steps, formed of stones from two to five tons in weight, which have been most carefully set and pointed to withstand the shock. The cost of the work is estimated at £1,600,000, and a feature of its execution is the comparatively few accidents with which it has been attended. One strike, lasting about a month, occurred, and this incident formed the only interruption to the steady progress of the work.

This magnificent result is of extreme interest to British engineers, who will doubtless soon be called on to provide some augmentation of the water supply to the City of London. While Manchester, Birmingham, Edinburgh, and Dublin have been looking to the future, London has been content to exist on her present none too plentiful provision. But recently, in addition, some fears have been expressed in high quarters not only as to the quantity, but also as to the quality, of the water supplied to metropolis, and hygienic experts have pointed out that a certain, and none too improbable, combination of circumstances would precipitate a catastrophe. The danger of a serious fever outbreak, which a polluted water supply would cause to spread indefinitely, will undoubtedly act as an incentive to provide an alternative, and the question to be considered is where a suitable catchment area can be transformed into a reservoir, without an excessive initial outlay in purchasing property, and subsequent expenditure in piping.

In this connection, Mr. Horatio Bottomley recently asked the President of the Local Government Board, if it is a fact that the inhabitants of East London are drinking daily 2,000,000 gallons of sewage effluent.

Of recent years a noticeable movement has been in progress to substitute steel and iron for timber in the construction of railway carriages and trucks. There still remains much to be done in this direction, as can be observed in the retention of such a large proportion of timber in the rolling stock of even the wealthiest and most moderny-equipped lines. Good wagons of iron were introduced into England over half a century ago, but were not considered a success, and it is only



recently that all steel trucks were introduced by American enterprise. In the goods service the use of the more durable material is immediately repaid by increased strength and a reduction of the dead load; both these qualities would apply similarly to passenger carriages if timber were eliminated from their construction. Probably, an impetus will be given in this direction by the extension of the electric system, in which all steel car construction is a desideratum to reduce the possibility of fire to a minimum.

The city of London Corporation, having the recent catastrophe at Charing Cross Station in mind, has ordered a thorough examination of the Smithfield Central Markets, to be carried out by Mr. A. S. Walmesley, M. Inst. C.E. His survey will also include the sub-structure in the railway tunnels under the markets, in order to ascertain whether the railway companies are fulfilling their duties in respect to proper maintenance. The buildings are often so crowded that an accident would have lamentable results. The examination is, therefore, a wise precaution, and the information obtainable by such a searching investigation will probably be of much utility to the engineering world. It is to be sincerely hoped that other bodies are causing similar examinations to be made of the structures under their control, for we are now approaching a period when badly-maintained ironwork, erected about 50 years ago, may be expected to show serious signs of failure.

Sir Alexander Binnie recently presented certificates to the students of the Crystal Palace Company's School of Practical Engineering, at the close of the hundredth term, and in the course of his remarks made some observations which should prove of much encouragement to the younger members of the engineering profession in these islands. After warning the students against specialisation, he said that they heard a great deal in the present day about the superiority of foreign nations, and he was simply disgusted when he read some of the observations to that effect in the Press of to-day. There seemed to be abroad an entire forgetfulness that in their own profession Englishmen had made engineering of world-wide significance. He wanted them to feel that the masters of their profession were Englishmen, who had sent railways throughout the world, who made the steam navigation of to-day, and that it was for the young men in the profession to carry on these great works to the credit of the great country of which they were sons. If they felt cramped at home they must go out into the Empire, where there was plenty of room, always remembering that success depended upon themselves and upon their work.

Some critics may cavil at the use of the word English in the address, remembering how much engineering owes to the genius of the Irishman and the Scot, but the general tone is one that well commends itself to all. Possibly never in the history of the world has the engineer had such opportunities as are offered to him at present, and while competition is keen, such a fact can but have a stimulative effect on the man who loves his work and means to bend all his talents and energies towards successful achievement.

The following observations from the report of Mr. Fraser British Consul, on the rebuilding of Baltimore, are extremely interesting from both professional and popular points of view. He says that too great praise cannot be given to the people of Baltimore for the energy they have shown in the rebuilding of the city after the great conflagration of February 7th to 9th, 1904. It was estimated that the loss of property on that occasion amounted to £25,000,000, and in the past 22 months the former buildings have been replaced, to a great extent, by some of a more substantial character, with a great improvement architecturally. Advantage has been taken to widen and straighten the streets in the burnt portion of the city, but much has yet to be done in laying down the roadways, which are, in some cases, in bad condition. This will, no doubt, soon be done, as it is intended to spend £1,000,000 for paving purposes. Ferro-concrete, or concrete reinforced with steel, has entered largely into the erection of buildings in Baltimore, with, it seems, considerable satisfaction. The concrete used is usually composed of one part best quality Portland cement, two and a-half parts clean sharp sand, and five parts  $\frac{3}{4}$ -inch stone, either granite or trap. An interesting test of strength was made a few weeks ago in a building in course of construction. A weight of 25,400 lbs. was placed on 84 sq. ft. of the second floor, and on a slab of concrete  $\frac{1}{2}$  ins. thick, the slab being supported by a beam 6 ins. by 8 ins. This weight was allowed to remain for twenty-four hours, and after it had been removed the beam only showed a deflection of  $\frac{1}{2}$  in. The cleansing of buildings from the effects of the fire by use of sand blown on to them by strong air pressure has been used to a considerable extent, and it certainly has been very efficacious. It is said, however, that it has the effect of

opening the face of the material heated, and makes it more liable to the reception of deposits of smoke, etc., and also to decay. The most noticeable feature of the report is the fact of the general adoption of the concrete steel construction, at a time when it may be confidently assumed that the question of material was carefully considered for reasons of economy, durability, and rapidity of construction. We understand that the ferro-concrete buildings at San Francisco stood well in the recent upheaval, and detailed reports will be anxiously awaited by those interested in this method of construction. The British Consul's report is another tribute to the energy and perseverance of the American citizen in the face of trials well calculated to depress and enervate the most philosophical community.

## REVIEWS OF CATALOGUES.

**The Patent Stone Dressing Tool Co., Ltd.**, Wicker Lane, Sheffield, enclose us one of their illustrated sheets comprising all their specialities for the working of stone by hand or machine power. These include, in addition to tools suitable for masons, builders, and quarrymen, a number of patent stonemaking and moulding appliances eminently adapted for their special purposes. The planing and moulding tools and the patent stone axes are constructed on scientific principles arrived at after a very lengthy experience. This Company has agencies in all the British colonies, and in several Continental countries. Their tools have proved an unqualified success, and are largely used both in the United Kingdom and abroad. They make stone saws, moulding and scabbling plates, quarry tools, drills, picks, wedges and crowbars, and in addition to their own specialities are prepared to quote for and supply tools made to customers' own specifications.

**Messrs. W. H. Baxter, Ltd.**, issue an interesting publication, entitled "Baxter's Reference Booklet," which we have pleasure in recommending to public bodies, road surveyors, quarry owners, and others interested in roadmaking and stonebreaking. The book deals principally with Baxter's Patent Knapping-Motion Stonebreaker, which for many years has practically ousted all other stonebreaking machines from the market. For a long time Road Surveyors and Borough Engineers condemned machine-broken stone as unsuitable for the road, and several had reverted to hand-broken stone as being the more satisfactory and economical. Mr. Baxter, who took out his first patent in 1878, had, therefore, great difficulty in convincing roadmakers that a machine could be made to produce a satisfactory sample of macadam. He had, in fact, a long uphill fight in the face of much opposition in winning recognition for his inventions. But through his own perseverance and the excellence of his machines he has gained the unique reputation he now holds. It is admitted on all hands that in the preparation of stone for roadmaking no one has contributed more to modern methods than Mr. W. H. Baxter. Full descriptions of the Baxter machines, as well as much useful information on stonebreaking and road-repairing, will be found in the booklet to which we refer. The address of the firm is: Messrs. W. H. Baxter, Ltd., Leeds.

**Messrs. The Plate Glass and Sylicate Marble Co., Ltd.**, Johnston's Place, Dublin.—This firm have handed us some literature dealing with Pilkington's patent wired rolled glass, and also a sample of Pilkington's patent corrugated wired glass, specially made for roof lights. The feature of this glass is that galvanised wire netting, of a small mesh, is inserted in the glass during the rolling, giving the finished material a toughness otherwise unobtainable. It is claimed that in the case of a fire occurring in a building this wire glass will not break and fall out in the same way as ordinary glass; it may crack all over, but will not fall out of the frame. The importance of a glass that will not act this way in the case of fire, was amply illustrated last month, when a loaded railway truck, standing outside Messrs. Pilkington's works, caught fire. It burned for some time before being discovered, and when discovered there was no immediate possibility of extinguishing the fire or removing the wagon. The flames, however, although cracking the windows of Messrs. Pilkington's factory, did not penetrate to the interior, where was stored a large amount of most inflammable material. If the windows had been composed of ordinary glass, probably the warehouse would have been destroyed. We understand that the Plate Glass Co. keep a stock of various patterns of wired rolled glass in their Dublin premises.

# BY-LAWS.

By MR. J. A. CROWTHER, A.M.I.C.E., President of the Institute of Sanitary Engineers.

## PART I.

What is the definition of a by-law? According to Ogilvie's Imperial Dictionary it is a local or private law; a law made by an incorporate body for the regulation of its own private affairs, or the affairs entrusted to its care. Town Councils, river trusts, railway companies, etc., enact by-laws which are binding upon all coming within the sphere of the operations of such bodies.

By-laws must, of course, be within the meaning of the Treaty of Incorporation, and in accordance with the law of the land—see Sec. 182, Public Health Act, 1875—and it is for the Court to judge if they are so. Societies not incorporated by treaty also enact by-laws, which, however, are only binding on the members of such society. (I propose to refer to this later on).

Owing to the very short time at our disposal, I propose to deal only with by-laws under the Public Health Act relating to building by-laws (of course, Local Authorities may adopt by-laws for a very great many other purposes, and they are all necessarily governed by the Acts previously cited, and subject to the rules laid down by the Courts).

The characteristics of a by-law were thus described by Lord Russell, Chief Justice, in *Kruse v. Johnson* (1898), 2 Q.B. 91:—"A by-law I take to be an ordinance affecting the public or some portion of the public, imposed by some Authority clothed with statutory power ordering something to be done or not to be done, and accompanied by some sanction or penalty for its non-observance. It necessarily involves restriction of liberty of action by persons who come under its operation as to the acts which, but for the by-law, they would be free or not to do as they please. Further, it involves this, the sections, that, if validly made, it has the force of law within the sphere of its legitimate operation."

It is enacted by Sec. 182 of the Public Health Act, 1875, that "No by-law made under this Act by a Local Authority shall be of any effect if repugnant to the laws of England or to the provisions of this Act." A by-law, to be in harmony with the laws of England, must be certain and determinate, and likewise reasonable. In determining the validity of a by-law made by a public representative body, the Court is slow to hold that a by-law is void for unreasonableness (*Kruse v. Johnson*, before-mentioned), the aim being to construe it so as to give reasonable effect to the object aimed at (*Lights on Vehicles*, *Walker v. Stretton* (1896), 60 J.P. 313).

A by-law so made will be supported unless it is manifestly partial and unequal in its operation between different classes, or unjust, or made in bad faith, or clearly involving an unjustifiable interference of the liberty of the subject (*Kruse v. Johnson*, *supra*).

## VIEWS OF THE L.G.B.

The Local Government Board gave expression to their views on this and other points in the following terms:—"The Board have, from time to time, had occasion to point out to Sanitary Authorities that the assumption in their by-laws of the power of suspending the operation of particular provisions in individual cases is open to much objection. (And what engineer has not found out this to be a fact?) Frequently the conditions under which this power may be exercised have been left undetermined in the by-laws, and the result is to impart a general uncertainty to provisions of which the precise scope should be clearly defined. Again, the Board have been called upon to criticise by-laws which, while purporting to lay down rules enforceable by penalties, ignore the necessary details, and substitute vague conditions which render compliance with the by-laws dependent on the approval, by the Sanitary Authority or their officers, of the mode of proceeding in each case. Such by-laws also are open to objection on the ground of uncertainty, and they do not fulfil the purpose for which the power of making by-laws was conferred upon Sanitary Authorities. The Board think that every person who, by neglect of the rules which a by-law is intended to prescribe, may be rendered liable to a penalty, is entitled to demand from those who impose such rules a clear statement of the course of action which must be followed or avoided."

"Further, a by-law must be reasonable. (Now, who is to define this?) The exercise of the power which the Legislature has confided to Sanitary Authorities must frequently bring them into contact with important interests. Within certain limits they may regulate the conduct of persons engaged in certain specified callings. They may impose restrictions upon the enjoyment of individual rights and privileges. Trade and property may, under certain conditions be affected by their action."

"These considerations point to the necessity for prudence and deliberation in the choice of by-laws, so that the duties and restraints which they create may not interfere oppressively with freedom of action."

# SOME BY-LAWS *Ultra Vires*.

A by-law under the Public Health Act of 1875 will also be invalid if it be repugnant to the provisions of that Act. Parliament has specified a variety of purposes for which by-laws may be made. For those purposes alone are by-laws authorised.

Sanitary Authorities cannot legally assume the power to make by-laws for carrying out the general objects of the Act. It follows, therefore, that every by-law must be strictly limited with reference to the terms of the specific enactment from which its force is derived. Any attempt, by a strained construction of any such enactment, to extend the range of a by-law should especially be avoided. But while it is of primary importance in framing a by-law to consider closely the language of the statutory provision which declares its purpose, the exact meaning of that language can never be safely determined without careful comparison of other enactments relating to the same or to kindred topics.

As before referred to, it must be remembered that by-laws are designed to supplement and not to supersede the express provisions of the Statute law. In the Public Health Act, 1875, and in the incorporated clauses, the subject of by-laws may sometimes appear identical with those of specific enactments. But in all such cases a closer examination will show that the subjects are not really identical.

A by-law is not unreasonable merely because the Local Authority have no power of dispensing with its application in any particular case (*Salt v. Scott-Hall* (1903), 67 J.P. 306). See also *Pomeroy v. The Malvern Urban District Council* (1903), 67 J.P. 375. As to the reasonableness of this particular by-law, the Court cannot say that it is unreasonable merely because there is no clause under which the Local Authority can dispense with its application to any particular case. "No doubt it is desirable that all building by-laws should contain such a clause, because exceptional circumstances may arise in any district; but although that is so, we cannot say that the want of such a clause is fatal."—Lord Alverstone, Chief Justice.

In order to illustrate the above, the before-mentioned cases are given in full at the end of this paper.

It is probable that most, if not all, of the gentlemen present will agree with the remarks of the Lord Chief Justice where he states (as quoted above), "No doubt it is desirable that all building by-laws should contain such a clause, because exceptional circumstances may arise in any district," etc.

As a matter of fact, we do find exceptional circumstances all over the country, and it is exceedingly difficult, if not impossible, to draw up a set of by-laws applicable to all parts of the country.

The town of Southampton is situated on a peninsula between the rivers Itchen and Test. The portion of the town immediately adjoining these rivers is resting on a bed of mud or silt some 30 ft. to 40 ft. thick; it is impossible to construct substantial buildings of brick or stone without having the foundation properly piled, which, of course, means a considerable amount of floor space is necessary in order to draw out the lines of the intended structure.

It was proposed to exempt such buildings from the by-law requiring them to be built of brick, stone, etc., etc. But no; the powers that be would not allow it. This is a very simple case, and I have no doubt whatever that most of the gentlemen present can add many more instances from their own experience.

Of course, in granting discretionary powers to Local Authorities there is always the risk that they will or may be misapplied, in some cases to favour a friend, and in other cases a member of a Local Authority, maybe, what he calls "get a bit of his own back" by thwarting some scheme or other proposed to be carried out by some person or persons with whom he may not be particularly friendly. It goes without saying that sanitary as well as other engineers must advise their clients, whether public bodies or private individuals, to the best of their abilities, and I am perfectly certain that this is done; but it must be borne in mind that, taking the case of a Sanitary or Municipal Engineer to a small Authority, he is, and necessarily must be, to a very great extent, subservient to, and may I say, with all due respect, in the power of the members of his Council, and if he should be so unfortunate as to disagree (perhaps owing to his superior education or experience) with some of the cantankerous members of his Council, then it is possible that his life would not be worth living. There are members present who, unfortunately, have had such experience.

Now, what can be a remedy for this?

(1) Our Association may assist, and, to a very great degree, in trying to form a comprehensive set of by-laws, with the necessary exceptions for the whole country.

(2) In obtaining, in conjunction with other societies, some method of protection for Sanitary Engineers while carrying out their work in the interests of the public.

(To be continued.)



### OUR NORTHERN LETTER. (FROM OUR CORRESPONDENT).

#### New Contracts.

There is practically no improvement in the general flatness of the building trade. One learns of only occasional minor contracts; and, if architects made money only by erecting new buildings or amending old, the majority of them would be in the poorhouse. For one substantial contract tenders were received on the 12th inst.:—Erection of a large block of shops, offices, etc., at Arthur Square and Arthur Street, the architects being Messrs. Blackwood and Jury, and the quantity surveyor Mr. S. C. Hunter.

Tenders are invited for building alterations and additions to Larne Grammar School, Co. Antrim. Plans, specifications, etc., can be seen at the office of the architect, Mr. W. J. Fennell, M.R.I.A., Scottish Provident Buildings, Belfast. Quantities have been prepared by Mr. W. J. McCarthy, same address. Endorsed tenders to be lodged with Rev. J. Kennedy, Larne, on or before Wednesday, 23rd inst.

Tenders are invited for the erection of a manse for the Committee of Second Islandmagee Presbyterian Church. Plans and specifications can be obtained at the office of the architect, Mr. Thomas Houston, Kingscourt, Wellington Place, Belfast, with whom endorsed tenders are to be lodged on or before 18th June next.

#### Completed Contract.

A contract for the very extensive enlargement of the Ormeau Bakery, Belfast, has been completed, and leaves this establishment one of the most up-to-date and best equipped in Ireland. The baking machinery, ovens, and other accessories have been supplied by Messrs. Werner, Pfeidcrer and Perkins, Ltd., of Peterborough and London. Portion of this machinery is the first of its kind to be introduced into the country. The electric motes and lighting were installed by Messrs. William Coates and Son, of Fountain Street, Belfast; shafting and wheelwright work, by Messrs. Hamilton and Co., Ltd.; plumbing, hot water and steam requirements were provided by Mr. John Clements. Hoists are by Messrs. Archibald Smith and Stevens, Ltd., Battersca. The general building contractors were Messrs. H. and J. Martin, Ltd., and the architect, Mr. W. J. Gilliland, F.R.I.B.A., 9 Howard Street, Belfast.

#### Engineering Appointments.

The second subsidence at the Alexandria Graving Dock has led the Harbour Commissioners to appoint Messrs. Hawkshaw and Dobson, of Great George Street, Westminster, London, Consulting Engineers to the Trust, in relation to all matters pertaining to the new graving dock and

other collateral works, including the repair and reinstatement of the Alexandria Dock, at an annual fee of £300, to cover all necessary work in London, and all necessary advice; the engineers being free to visit and inspect the works at discretion for a fee of £10 10s. 0d. per day and all expenses.

The Coleraine Rural Council have appointed Mr. McGiven, Civil Engineer, Coleraine, to act as arbitrator in claims for trespass in connection with new water supply.

In our issue of the 7th April, editorial comment was made on the action of the Donaghadee Urban Council in "inviting" tenders from engineers for preparing sewerage and walls schemes for the town. Not content with this, these dispassionate gentlemen are going further. They reduced the candidates entered to two, viz., Messrs. Swiney and Croasdale, of Belfast, and Mr. Weaver, of Gloucester; and, with a view to determine which of these parties are the more eminent and suitable, have invited them to visit and inspect the town and environs and, subsequently, "to interview the Council in order to give their ideas as to a proper wall and sewerage scheme for the town"! What do you think of that for cheek, cockies? One Lieutenant-Colonel Delacherois is chairman of these generous Solons. If what I hear be true, however, there is a possibility, tinged with probability, that none of the engineers accepting the first invitation will be appointed because there is the chance that a new point, as to the jurisdiction of an Urban Council in a matter of this kind, may be raised. Pending developments, though, I am not at liberty to define it.

#### Modern Paintings Exhibition.

The Exhibition of Modern Paintings in the Corporation Art Gallery has been more than the success which its promoters hoped. Far and wide, it has aroused interest, and it is practically certain that a few of the most valuable pictures in it, which are for sale, will be bought for presentation to the city. It has come to the art circles of the North like the angel's visits to the Pool of Siloam, than which those were not more stagnant. Another most interesting and instructive exhibition has also been running, in the Ulster Arts Club, which in its short life has done more for art in the North than all the movements of a century. This exhibition is of original drawings by Mr. Hugh Thomson, R.I., an honorary member of the Club, and among the greatest black-and-white illustrators of the day. Mr. Thomson is an Antrim man, and received his art education in the still famous, if defunct, firm of Marcus Ward and Co., Ltd., of Belfast. Following necessity, Mr. Thomson has gravitated to London. It is to Mr. P. E. Ward, formerly of the older firm, and now of Messrs. Ward and Partners, that the credit of organising the Hugh Thomson Exhibition is wholly due.

### FIRE TESTS OF CONCRETE FLOORS.

Two Reports issued by the British Fire Prevention Committee give the results of tests conducted upon two floors consisting of broad flanged steel beams and light steel joists with a filling of concrete, the aggregate being gravel in one case and furnace clinker and coke breeze in the other. Examination of the Reports shows that the results were very different, as the clinker and breeze concrete afforded far better protection than the gravel concrete, and, so far as concerns resistance to fire, it appears to be clear that the former aggregates are distinctly superior. It should not be inferred, however, that cinder concrete is generally more suitable than gravel or stone concrete, for the question of strength and the protection of metal from corrosion have also to be taken into account. Clinker and coke are light but relatively weak, and, owing to their capacity for the absorption of moisture, often cause voids, which account for the quantities of steel that have been rusted when encased in concrete mixed with these materials as aggregate. Sometimes, also, they contain oxide of iron, which facilitates corrosion. The remedies for these disadvantages are to be found in the use of sufficient water and cement to guard against voids and to cover the aggregate. With proper attention to these points clinker and coke concrete may be used with entirely satisfactory results in floors of construction akin to those forming the subject of the present Reports. It would be very unwise, however, to draw the hasty conclusion that, for different forms of design and for other purposes, cinder concrete should be substituted for concrete made with gravel and other stone.—*The Builder.*



The New Technical Schools at Coleraine.

Illustration by permission of the "Coleraine Constitution."

# UNIFORM DESIGN OF REINFORCED CONCRETE.

Reinforced concrete, although the most popular form of fireproof construction at the present day, is a veritable chaos as to its design.

Quoting from a recent publication: "Many systems are patented and it is a common matter for designs to be furnished free, contingent on the designer's patent being used."

This seems to be an unnecessary state of affairs. Reinforced concrete should be standardized. Structural steel construction has been standardized until all mills roll the same sections. Standards devised by the various steel companies are practically uniform. There are no patents to speak of, and all designers uniformly adopt the standard sections rolled, and specify the uniform connections.

There is no reason why reinforced concrete should not be brought to the same state of uniformity as structural steel.

It is true that there at present a great variety of so-called "systems" which have more or less merit, but it is also true that perfect construction can be and is every day being devised which is not using patented forms or methods.

Standard methods should be adopted in such a form that the architect, engineer or contractor is made entirely independent of the so-called patented "systems," and at the same time the standards should be arranged so that where it is shown profitable a patented section could be substituted for the reinforcement shown upon the plans of the designer.

Until some systematic action is taken to standardise reinforced concrete, designers will be handicapped by the necessity of specifying some particular "system" or leaving the plans open to a free-for-all scrap as to who can do the work for the least money.—*American Exchange*.

## ENGINEERING NEWS.

**Antrim County Council.**—APPOINTMENT OF ASSISTANT SURVEYOR.—Arising out of the report of the Finance Committee, which contained a recommendation of Messrs. T. J. O'Neill and L. A. Pollock for the position of assistant county surveyor at £100 a year, on a poll being taken, Mr. O'Neill was appointed.

**Cork.**—The Cork Rural District Council have received tenders for construction of Waterworks at Knockraha.

**Callan.**—The Board of Guardians of Callan Union will, to-day, Saturday, 19th May, receive tenders for the supply and erection of an 80-gallon boiler in the main kitchen of the workhouse.

**Donegal.**—The Donegal Rural District Council invite tenders for the execution of the following works and supply of the following articles:—First, the erection of a gas-generating station (stone-built and slated); second, the construction of a concrete tank for gasholders; third, the excavation of pipe track (about two miles), the refilling of same, and maintenance of streets, in accordance with plans and specifications of James Steadman, Esq., M.E., which may be seen at the office of the Clerk of the Council. Separate tenders to be sent in for each item. The Council also invite tenders for the delivery, carriage paid, at Donegal Railway Station, of about 3,500 yards wrought iron tubes, 3 inch to 4 inch diameter (water quality), also fittings for same. Tenders to state discount off standard list. Tenders close on May 22nd.

**Dublin.**—NORTH DUBLIN RURAL DISTRICT COUNCIL.—The North Dublin Rural District Council received tenders for the erection of a corrugated iron fence on their property, Cabra road.

The Lighting Committee of the Corporation of Dublin are prepared to receive tenders for the supply of sub-station switchboards and accessories, transformer pillars. Tenders to be delivered not later than Monday, 28th May.

The Waterworks Committee of the Corporation of Dublin invite tenders for fire signalling apparatus, annunciator, switch-board, internal wiring, and fire alarm bells, to be provided and fitted up in connection with the new Central Fire Brigade Station, Great Brunswick-street. Tenders to be lodged at the Waterworks Office, on Monday, May 28th.

**Derry.**—Tenders were received for the construction of a reservoir at Springtown, Derry, for Samuel Osborne, Esq., according to plans and specification. Mr. W. E. Pinkerton, M.R.I.A.I., 11 Shipquay-street, Derry.

**Dalkey.**—DALKEY URBAN DISTRICT COUNCIL.—The Urban District Council of Dalkey invite tenders for the construction of about 340 yards of a 12-inch sewer at Saval Park road. Tenders must be lodged on Monday, 21st May.

**Galway.**—The Galway Woollen Factory are putting in entirely new plant and machinery.

**Macroom.**—The Council of the above Urban District received tenders for the construction of sewerage works in the town of Macroom, in the said Urban District, in accordance with plans and specification prepared by Mr. A. W. Barnard, C.E.

**Macroom.**—At the meeting of the District Council it was decided to appoint Mr. Murphy as temporary engineer for four weeks at a salary of £2 a week. It was decided to advertise the vacant appointment.

## IMPORTS.

### PORT OF DUBLIN.

May 3rd, per City of Cologne, from Rotterdam, 4 bundles slates to order; per Lady Roberts, from London, 70 packages lead, T. Dockrell, Son, and Co., Ltd.

May 4th, per City of Brussels, from Ghent and Antwerp, 2,700 bags cement, 8 cases limestone, to order; 100 cases window glass, Hoyte and Son; 6 do., do., De Greele H-andret; 64 do., do., A. Bassi; 4 do., do., W. Martin, Son, and Co.; 76 do., do., T. Dockrell, Son, and Co., Ltd.; 30 do., do., Plate Glass Co.; 95 do., do., Arigbo and Son; 1 do., do., Le Personne and Co.; 70 do., do., Brooks, Thomas, and Co.; 25 do., do., H. Sibthorpe and Son; 867 steel joists, 4 cases plate glass, 10 cases marble, all to order; per A. Broeklebank, from Rochester, 200 tons cement, A. Agnew; per Renown, from Rochester, 210 tons cement, A. Agnew; per Lady Olive, from London, 439 sacks cement, to order.

May 5th, per Coniston, from Chester, 145 tons bricks, Morgan, Mooney, and Co.; per Catherine Latham, from Chester, 120 tons brick goods, Monsell, Mitchell, and Co.

May 7th, per Bengore Head, from St. John's, N.B., 12 packages ladders, to order; per Lonsdale, from Whitehaven, 230 tons cement, Kinley at Balbriggan; per Lady Hudson-Kinahan, from London, 1,000 sacks cement, T. Dockrell, Son, and Co., Ltd.; 800 do., do., A. Agnew.

May 8th, per Lady Olive, from London, 440 sacks cement, J. M'Ferran and Co.

May 9th, per Lady Martin, from London, 1,000 sacks cement, J. Kelly and Son; 500 do., do., R. Martin and Co.

May 10th, per Barbara Moir, from Glasgow, 90 tons bricks, E. and J. Burke; 29 tons do., do., Monsell, Mitchell, and Co., Ltd.

May 11th, per Renown, from Port Dinorwic, 95 tons slates, J. Kelly and Son; per Lady Roberts, from London, 38 packages lead, J. Boyd.

May 14th, per Olga, from Bendort, 100 tons crushed pumice, Rome and Co.; per J. and A. Coppack, from Chester, 100 tons fireclay goods, Morgan, Mooney, and Co.; 28 do., do., J. Parkes and Co.; 14 do., do., E. H. Tickell; per Queen of the West, from Portsmouth, 190 tons whiting, Boileau and Boyd.

## CONTRACTS.

### COUNTY BOROUGH OF WATERFORD.

#### TECHNICAL INSTRUCTION COMMITTEE.

#### TO CONTRACTORS.

Tenders are invited for the Furnishing of the Chemical Laboratory at the Waterford Central Technical School.

All particulars can be had on application to Mr. J. J. Fleming, C.E., 44 Lady Lane, Waterford.

Tenders addressed to the undersigned, endorsed "Tender for Furniture," will be received up to one o'clock on Friday, the 25th May, 1906.

By Order,

JAMES J. FEELY,  
Secretary.

Town Hall, Waterford,  
8th May, 1906.

**SURVEYOR'S CLERK** (aged 23), nearly seven years with London firm, three years under articles, with knowledge of rent collections, making plans and tracings, building work, specifications and all general work, seeks ENGAGEMENT; excellent references. Apply, H. Wentworth, 19, Talgarth Road, London, W.

**BUILDING SITES** to be Let at Howth, Nashville Estate. For particulars, apply McCarthy and Anderson, Civil Engineers, 39 Westmoreland-street.

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HEAD OFFICE

JUNE 2, 1906.

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## TOPICAL TOUCHES.

"Architectural History," says Mr. James Bryce, the Chief Secretary, "gives a new interest to travel; it embodies, as hardly anything else does, the life of a people. The essence of all profitable travel is to make you ask the reason for what you see, and nothing does this more than the study of architectural history."

A difference as to the prices and quantities of certain extra works arose in connection with a contract for certain additions to Aughrim-street Church, Dublin. It has been agreed to submit these matters to arbitration. The architect has nominated Mr. Anthony Scott, M.S.A., Architect, and Mr. James Donovan, the contractor, has appointed Sir George Moyers, D.L., as their respective arbitrators.

At a meeting of the Royal Institute of Architects of Ireland on Tuesday, the new general conditions of contract, about which several letters have lately appeared in our columns, were adopted without discussion. A motion proposed by Mr. R. Butler, and seconded by Mr. G. F. Beckett, that a special evening be set apart for detailed consideration and discussion, was negatived by a small majority.

We regret this decision, mainly because it will undoubtedly prevent the uniform adoption of a standard form of contract, as many members will now adhere to their own forms. The conditions are, unquestionably, cumbersome and difficult to understand, and there is not the slightest doubt could have been, without loss of effect, reduced to half their present bulk. Moreover, as the correspondence in our columns showed, they are not acceptable to the general body of the master builders, who claim that they have not been consulted on this, to them, vitally important matter. Moreover, the adoption without a word of discussion of conditions which, it is safe to say, nine out of ten members have not made themselves acquainted with, undoubtedly places the Institute in a false position.

At the same meeting a proposal to double the subscription of members to the Institute was referred to a general plebiscite.

The Royal Institute of British Architects intimate that it would enormously facilitate the arrangements now being made by the Executive Committee if members of the Institute who intend to take part in the International Congress of Architects would signify their intention of doing so as early as possible. Subscriptions, £1 (subscribing member), £4 (donor), 10s. (lady), should be made payable to "The Secretary, VIIIth International Congress of Architects," 9 Conduit-street, W. In making their arrangements (necessarily involving great expense), the Executive Committee are counting on the support and co-operation of the General Body of the Institute, but membership of the Congress is open to all architects throughout the Kingdom, whether members of the Institute or not. The Congress will take place in London during the last week of July. Much support has already been obtained, and an excellent programme arranged.

In this issue we publish particulars of a case recently heard before the Master of the Rolls, in which some points of interest in relation to party walls occurred. We shall be glad if our readers will aid us by sending us particulars of any law cases or arbitration in which they may be engaged. Oftentimes points of great interest and value to the general building community arise and are not recorded.

The new line of direct steamboat communication between France and Ireland (Dublin to Treport) should give a great stimulus to direct trade between the two countries. Its establishment is largely due to the efforts of the present French Consul in Dublin, who has been most energetic in the matter. The absence of direct communication has handicapped the exportation of such things as Irish marble, etc., while Caen stone (largely used in this country for altar work), Belgian cement, Belgian steel, and a host of other goods outside the building trade are rendered more costly by their transhipment through England, and thus enterprise in Ireland is retarded, to the detriment of commercial speculation. Ireland once possessed a considerable trade with the Continent, and may do so again.

A movement, deserving of every success, is on foot to acknowledge in some suitable fashion the great services rendered by Mr. Hugh P. Lane in stirring up an interest in art in Ireland, and it has been thought that a portrait of himself would be the most appropriate and acceptable form in which to offer the testimonial. So far, we are in entire sympathy with the project, for no man of the day has done more than Mr. Lane to try and arouse interest in modern art in Ireland, and with unexpected success so far. More than that, he was mainly instrumental in getting together the fine exhibitions of modern paintings in Dublin and Belfast, and has further acted with a fine public spirit and generosity in giving from his own private collection a number of most valuable modern paintings to help in laying solid the foundation of a worthy collection of modern art in Dublin.

We observe with some little disappointment that it has not been thought fit to entrust the commission to paint the portrait to an Irishman, and that it has been given to an American.

We have the highest admiration for the genius of Mr. John Sargent, R.A., the artist selected, for no portrait painter of the day stands higher in the estimation of those qualified to judge, but one cannot conceal the feeling that his long and almost interminable series of fashionable portraits have by degrees become somewhat stereotyped and lacking in those peculiar qualities of life, vigour, and originality that mark a really great portrait painter, admirable as they remain in technique; and then besides we have, poor as our Irish school of painting is, a few Irish portrait painters capable of doing adequate justice to such a work. We need only mention John Lavery, Thadeus, and, amongst the younger men, J. B. Yeates and Wm. Orpen. We cannot help thinking that it would be a more graceful compliment had an Irishman been given the chance of "rising to the occasion."



## CHAIN CABLE GROYNES.\*

The loss of land due to the sea's encroachment on many an exposed stretch of foreshore in the British Isles has for generations past given rise to grievous complaints from the unfortunate coast line owners, and more particularly from those interested in the protection of sea-side resorts where valuable building land is threatened or actually disappearing, together with the houses erected upon it. During the past three or four years this outcry seems to have increased in intensity, and the panic stricken owners have petitioned Parliament for assistance in keeping the all-devouring foe at bay. Most of those claiming this assistance hold that the protection of the coast line from the sea should be made a national question—i.e., that the whole community should be forced to contribute towards the protection of those few whose property is attacked by the forces of nature.

Of course, it goes without saying that sympathy is very freely extended to those whose misfortune it is to be situated in close proximity to a volcano, or in a neighbourhood where earthquakes or tidal waves may be looked for, and, in the same way, sympathy is felt for the owners of land now being filched from them in so many places in these islands. One feels that in the case of harbours, built for the accommodation of shipping, the whole nation is concerned, and the question of their construction is in most cases eminently a national one, but it may be a moot point whether the whole country should be taxed for the benefit of the few.

The author speaks feelingly on this point, because he has lost nearly 100 acres of land on the shore of Dingle Bay, in Co. Kerry, since the year 1842. The advance of the sea in those sixty odd years has been in many places as much as 100 feet, and good pasture and building sites alike have been engulfed in the insatiable maw of the restless Atlantic. The loss of land is pitiful, and the attempts at protection have led to still further loss in solid cash, but neither the author nor his predecessors have ever thought of applying to the Government for protection or pecuniary aid. Yet the position at Glenbeigh is every whit as hard as that which is complained of at any place in Yorkshire, Norfolk, Suffolk, and Essex.

Now that the Government has promised to appoint a Royal Commission to enquire into the question of erosion, there can be but little doubt that some important facts will be forthcoming, and it is to be hoped that if, as a result of the deliberations of the Commission, the administration decides to grant State aid to landowners in England, such places as Glenbeigh and the whole of the East coast of Ireland will not be forgotten, and that this country generally will participate in the advantages of beneficent legislation. The author's own opinion is that such legislation will prove altogether too costly for the country to stand, and his suggestion is that the Government should establish a Department, or distinct branch of an existing Department, which should undertake certain surveying and keeping of records which will be of enormous value in the future both to landowners and those engineers who are employed by them in devising coast protection works.

For many years past the author has exerted himself to bring about the establishment of such a Department, and the following letter to the *Times*, with replies from the "Board of Trade" and "Board of Agriculture," is sufficient to roughly indicate the scope of the work and the difficulties which would attend the establishment of such a Department. However, it seems probable that whatever the cost might be, it would be small in comparison to that which would be required in the gigantic task which many enthusiasts think the Government should undertake.

The letter above referred to is dated October 4th, 1899, and runs as follows:—

"At the present time there is absolutely no official and reliable record of the changes annually taking place round our coasts, and these changes are constantly affecting buildings and other works which have been carried out at a large outlay of public money.

"Lighthouses, coastguard stations, roads and other necessary structures are maintained chiefly at the national expense, or by County Councils and local authorities, and it would, I feel sure, be advantageous if annual

surveys were taken and returns given which would enable engineers to take the necessary protective steps before any serious damage had occurred.

"The Admiralty charts are excellent for deep sea soundings and for purposes of navigation, but they contain very little information on the question of current affecting the coast line, and it would require the careful attention of a department, or distinct branch of a department, to keep a satisfactory record which could be relied upon when the time for action arrived. As matters stand at present, it is, as a rule, only at the eleventh hour, and after considerable damage has been done, that an engineer is called in, and the mischief is then probably so considerable that only a large expenditure of money can save the situation; whereas, had the note of warning been struck a year or two sooner, the catastrophe might have been averted at comparatively trifling cost.

"Amongst the duties of the suggested department the following may be enumerated:—(1) The systematic and repeated taking of sections, over the same lines, on all doubtful shores, as well as contours of high water, low water, and mean sea level lines; this latter is very important, as much damage is done during storms taking place at half tide. (2) The taking of soundings. (3) Calculations based on observations respecting the varying rates and directions of currents at high water, low water, and mean sea level. (4) Observations as to the velocity and *vis viva* of waves. (5) Observations on the travel of beach, sand, and other material, especially round headlands, piers, breakwaters, and across bays and the estuaries of rivers.

"As one of the superintending engineers of the late Mr. Edward Case, I had frequent opportunities of discussing the question with this gentleman, whose system of groyning is now so well known and appreciated at many places in England and Ireland, and we invariably came to the conclusion that the whole question should be dealt with as a national one, and that all shores—save alone rock-bound coasts, the alteration in which is so slow as to be practically nil—should be closely watched by the State.

"The Ordnance Survey maps are, of course, admirable, but they only show the changes in high and low water marks at long intervals of time. What we require is a succession of observations by means of which any mischief may be readily detected and dealt with in its initial stage, on the stitch-in-time principle.

"Did space allow, I could multiply examples of instances where acres of valuable land and house property have been lost, an engineer only being called in at the last moment, when some county road, building, or a railway line was in jeopardy. This kind of thing is hardly fair to the profession, and is analogous to calling in a doctor to see a moribund patient.

"Cases like this would not occur if the State took the matter up, for the competent men in charge of the department would at once give notice on the approach of danger, which might be threatening not only the immediate foreshore owners, but the owners of low-lying property far inland, and the proportion of cost to be borne by all interested in the necessary works could then be determined. Procrastination—that worst enemy to economy—would be avoided, and everyone would benefit.

"How such a department should be constituted, and whether it should be under the control of the Admiralty, the Board of Trade, or the Office of Woods and Forests, are questions quite out of my line, but, from observation and experience, I believe that a large saving in the future would result from the adoption of some such scheme as I have suggested."

Soon after the appearance of this letter the author got into communication with the Board of Trade and the Board of Agriculture, and received the following replies:—

"7 Whitehall Gardens, London, S.W.,  
17th October, 1899.

"Board of Trade (Fisheries and Harbour Department).

"SIR,—With reference to your letter of the 4th inst. relative to a suggested establishment of a department to undertake various duties in connection with the protection of the coast of this country against erosion by the action of the sea, I am directed by the Board of Trade to inform you that it appears to the Board that the proposal, if carried out, would entail very considerable expense, and would probably necessitate the revision of many Acts of Parliament under which the coasts are now protected.

"In all the circumstances of the case, the Board of

Trade are disposed to think that the scheme is not feasible at present.—I am, sir, your obedient servant,

"T. H. W. PELHAM.

"R. G. Allanson-Winn, Esq."

"Board of Agriculture, 3 St. James's Square,

"London, S.W., 6th January, 1900.

"6064. No. B. 1899.

"SIR,—I am directed by the Board of Agriculture to advert to your letter of the 9th ult., and to say that the Board have read your communication with much interest. The only portion of the work which you propose should be undertaken by the Government which it would be practicable to entrust to the Ordnance Survey is that which relates to the systematic and repeated taking of sections and contours of all shores subject to change, and the Board do not think that it is at all probable that the Treasury would feel justified in providing at the public cost for the considerable expenditure requisite for the purpose.

"The Board might, however, suggest that your proposals should be brought under the notice of their Lordships and the Admiralty.—I am, sir, your obedient servant,

"R. G. Allanson-Winn, Esq."

"P. G. GRAGIE,

"Assistant Secretary.

About this time the complications in South Africa began to absorb public attention to the exclusion of all other topics, and it was impossible to then pursue the matter any further.

Early in 1899 a Committee was appointed by the Council of the British Association, with Sir Archibald Geikie chairman, to consider further the question of the erosion of coasts round the British Isles, already reported on to the Association by previous committees; and this committee has arranged, by the kind assistance of the Admiralty, to obtain returns of changes noted from time to time in the shores of the several coastguard districts along the coast of any protective works which may be carried out, and of the effects produced by such works.

The above appears in a footnote in the "Minutes of Proceedings of the Institution of Civil Engineers," Vol. CXXXIX., Section 1899-1900, part I., and doubtless a step in the right direction has been taken; but it does not go nearly far enough. It is obvious that the coastguards are not in a position, from their training and equipment, to take the sections, make plans, and keep records in such a manner as would be serviceable to engineers when called upon to execute works.

It would, for instance, be very difficult for a coastguardman, however intelligent, to give a satisfactory account of the "effects produced" by protective works unless he had taken sections, etc., when the works were started, and could compare them with later sections, etc.

It seems to the author that if we can now ascertain certain details and facts connected with inland measurements from the Ordnance Surveys, and can also obtain from the Admiralty charts and deep sea soundings necessary to navigators, it is little short of an anomaly that we should be thus left in the dark in the matter of the coast line, which in many places is undergoing such rapid and continuous change.

What is really wanted is a scientific and continuous record of all changes in the coast line, that borderland between high and low watermarks. Few seem to realise that this strip of at present neglected land extends for some thousands of miles round these islands, and that in the aggregate the interests assailed are very large.

In Germany the State is assisting scientific experiments now being made respecting the changes taking place in many of the larger rivers, with the view of ultimate saving and improvements. Why, then, should not the authorities in these sea-girt islands take some steps in the right direction? "Britannia Rules the Waves" until they actually touch her shores, and then the positions are frequently reversed, as we see by the flooded lands, silted-up harbours, broken-down sea-walls, and eroded cliffs, which are to be found all round the coast.

It should be easy to find out (by reference to such records, plans, and sections, as have been suggested) the existing and previous condition of any given shore frontage as it is now to ascertain the length of Sackville-street or the size of Stephen's Green.

The question is admittedly one of great interest and importance, and, as such, it should be worthy of scientific and systematic attention. The author considers that he will

be very fortunate if in the future years of his life he is enabled, by diligent study and repeated experiment, to throw a somewhat stronger light on even a few of the many intricate problems involved in this particular branch of civil engineering.\*

About three years ago it occurred to the author that the sea's encroachment at many places which he had under observation could not be accounted for solely by the erosive influences of waves and currents acting on the visible shore between high and low water marks, and that the more serious agencies of destruction were at work on the sea bed below low water level.

It will be readily admitted that every step down the slope of any shore at low tide brings us nearer the foundations of that shore, and that the highest point of the foundations is reached at extreme low water level, and it would also seem to follow that any undermining of these foundations must in time necessarily lead to the loss of the shore.

† After long continued observations and careful consideration the author is inclined to believe that, in all situations where the encroachment of the sea is steady and continuous, and the material is of a soft and easily eroded nature for a considerable depth below low water level, protective works erected on the visible shore cannot be expected to afford more than temporary relief. In such cases we are fighting an inaccessible foe, as it is hardly to be supposed that devices on the small stretch of beach or sand between high and low water marks can materially affect the action of currents and wind waves operating, say, down to the five fathom line or ten fathom line.

The author has repeatedly noticed that when any important works are about to be started, the greatest attention is bestowed upon the surface currents, and experiments are conducted with floats, etc., whilst the material-bearing and material-shifting currents near the bottom are, by comparison, neglected.

It is known that currents are frequently found in deep water—especially off estuaries, etc.—running in directions diametrically opposite to the surface currents, so that, if we are to know something about the action of such currents, we must study them in conjunction with the wave and storm factors—not alone by corks and floats on the surface, but also by recording instruments near the bottom.

At Youghal, Co. Cork; Bray, Co. Dublin; and Glenbeigh, Co. Kerry, as well as at many other seaside places in England, Scotland, and Ireland, considerable quantities of material are torn from the sea bottom, in depths far below low water level, and cast up on the shores. For example, at Youghal, after the severe on-shore gales of January, 1903, the shore was literally strewn with stones of various sizes. Some bore evidence of considerable attrition, whilst others, with sharp edges, had clearly been freshly torn from their positions by the agency of the storm acting on the long deep-sea weed attachments (*Laminaria Digitata*), which had caused them to be thrown on shore. Some of these stones weighed 40 to 50 pounds, and the seaweed attachments were often over 6 feet in length. Now, as these weeds are only found in deep water—i.e., depths below low water level, and the stones, sand, shells, etc., are firmly attached, there can be no doubt that erosion is going on in the offing and in situations inaccessible to ordinary walls and groynes. That heavy material is often moved in from depths of 10 fathoms and more is now no longer a matter of doubt—it is a proved fact.

We will now suppose, for the sake of argument, that 100 cubic yards of material has been thus cast up on a particular shore, and that it is conclusively proved that it came from the deep water off shore, it will be readily admitted by most people that on the removal of this mass of material there is deeper water above the situations from which it was moved than there was before, and this, on a sea bed sloping upwards towards the shore, must indicate the nearer approach of deep water. No other interpretation seems possible, and this advance, taking place miles out at sea and in several fathoms of water, cannot well be connected with the surf or breaking-wave action between high and low water marks on the visible shore.

A comparison of the conditions obtaining at Glenbeigh and other places, as well as on the east coast of England,

\* "Transactions, Inst. C. E. I. Vol. XXVII., 1902.  
† "Public Works" Sea Coast Erosion and Remedial Works.



led the author to search for some explanation of the phenomena.

Two circumstances were apparent at these places. The sea was encroaching rapidly, and the substratum was soft in each case, and, unless some connection could be established between the erosion caused by surf or wave action and that which is clearly caused by the movement of material composing, or lying on, the sea bottom below low water level, it would seem impossible to remedy both evils by dealing with one alone.

The author found that material lying immediately beneath the mountain waste at Glenbeigh was soft, yellow sand, and that soft material extended for some depth below low water level. He also found that the glacial drift, sand, laminated clay and other soft material composing the Holderness coast of Yorkshire extends to a depth of 100 to 200 feet before the hard chalk is reached. These circumstances led him to consider that possibly the two erosions, though going on simultaneously at both these places, may be so far independent of one another that the checking of the one would by no means necessarily stop the other.

The consideration of protective works being reserved for the concluding portion of the paper, it may not be amiss to now refer to the devastating march of the sea as it is occasionally recorded by history or tradition. An examination of the records of several places on the east coast of England tends to prove that in the olden days towns and villages stood directly over the site of the present five-fathom line—i.e., there is now a depth of 30 feet of sea water where formerly dry land alone was to be found. Here again we observe the advance of deep water; and since it is improbable that the general inclinations of the shore and sea bottom have very materially altered since the old days, we may fairly suppose that when those ancient towns existed the then five-fathom line was a mile or so out to sea—i.e., two miles from the present coast line.\*

Again referring to Glenbeigh, observations since 1842 reveal the fact that the encroachment of the sea at one portion of the foreshore has been over 1,000 feet in little more than 60 years, or an average of over 17 feet per annum. On the Holderness coast of Yorkshire the annual erosion may perhaps be from 5 to 20 feet, according to the locality between Bridlington and Spurn Point. The rapidity with which the changes are effected depends so much upon the situation that it would be useless to attempt to lay down any rule based on calculations respecting the hardness of the material attacked. The travel of flint shingle is responsible for much erosion where rocky shores are concerned, though possibly in such places the alterations—could observations be made to fix the extent—might only amount to a few inches in 100 years. There are also places, e.g., Bray and Hastings, where the travel of shingle greatly accelerates the erosion of softer material, such as marl and sandstone.

It has been estimated that some 3,000,000 tons of detritus—mud, sand, and shingle—are eroded each year from the Holderness coast between Bridlington and Spurn Point, and the great probability is that much of this material contributes to the silting up of the Humber estuary and the Wash, whilst the continual pushing seaward of Gibraltar Point near Skegness is very likely due to the same cause. It seems to be beyond doubt that the Shingle accumulations at Spurn Point are composed of the flints, agates, etc., which form the hard portion of the cliffs of glacial drift between Bridlington and Spurn. The trend of all this material being from North to South the shingle is thrown up at Spurn, and the sand carried hither and thither in suspension is ultimately deposited along the east coast, possibly as far south as Essex, some appearing on the visible shore and some sinking to the bottom of the sea, and thus shoaling the deep water in the offing.

As regards the magnitude of time involved in many of these changes, we are reminded that the human epoch is to the geological epoch as the microbe is to the megatherium, and that, therefore, when we are able to note any very considerable geological changes taking place well within the limits of an ordinary lifetime, we should seize with avidity the opportunity afforded for investigation.

It may be mathematically proved that no particle of

material can be eroded from a sloping sea bottom—i.e., where the slope is the continuance downward of a shelving shore—without a corresponding deepening of the sea at that point and an advance of deep water on the land.

It is also known that countless agencies, such as marine borers, shellfish, etc., are constantly at work distributing material which is then more readily moved by storms and currents.

Another very fruitful source of deep-sea erosion, which has received very little attention, is that which has only recently been discussed in connection with foreshore changes—viz., the movement of material by submarine fresh water springs, such as the Hesse Whelps or Bridlington intermittent springs.

The author's attention was first called to this on reading various papers connected with submarine cables, the fractures in which it is thought may often be caused in very deep water—many hundreds of fathoms—by the action taking place at the exits of submarine rivers and springs.\*

In reading through the papers and letters on this subject it is impossible not to be impressed by the weight of evidence in favour of the shifting of material lying at the bottom of the ocean in very deep water, and adopting an *a fortiori* line of argument, one would suppose that if such movement of material can be brought about by these agencies in great depths where the pressure of the sea water must be enormous, movement will also be possible in the shallow water of the North Sea, where the pressure is not nearly so great.

We have then in all cases, where the coast material is of a soft and easily eroded nature for any considerable depth below low water level, to take the following into consideration:—

#### Chief Causes—

1. The surf and wave action, aided by currents, on the visible shore between high and low water marks.

2. The erosion going on below low water level, perhaps many miles distant, and in 5 to 10 fathoms.

#### Contributing Causes—

3. The action of countless borers, shellfish, worms, eels, etc.

4. The action of submarine springs.

That the two chief causes are not necessarily connected seems to be sufficiently apparent by the distances both horizontal and vertical, the one being confined to the short extent of visible shore and the range of tide, whilst the other is operating at a distance of many miles in the offing, and in 30 to 60 feet of water. If, therefore, this erosion below low water level continues to aid the advance of deep water landwards, we find ourselves confronted by an inaccessible foe. It is impossible to controvert the fact that deep water now exists in many places immediately below the former sites of towns and villages, nor can it be denied that this is deep sea erosion, and that it is now going on.

The sea is ever at work pulling down and building up, washing away and depositing, and the two processes are exactly equal as regards the particles moved, and merely represent a change of position of certain masses of material—what is taken away must be deposited somewhere. The softer the material the sooner it is eroded and carried elsewhere, but wherever the sea makes a dead-set on the coast line, and continues long enough in the effort, the erosion goes on—rapidly with the sand dune, mud bank, soft marl, etc., slower with the chalk, and yet slower still with the rocks, be they sandstone, slate, granite, or basalt. The geologist and foreshore engineer should always go hand in hand.

As regards the contributory causes above tabulated, it is possible to collect information as to the extent to which marine worms, etc., eat into both rocks and marls, and, if an estimate were made of the amount of material disturbed by such agencies over, say, one square mile of sea bottom, it would be found that a very considerable mass was eaten out of the sea bed, and rendered highly sensitive to the action of currents.

\* "Submarine Gullies, River Outlets, and Fresh Water Escapes beneath the Sea Level," by Henry Benest, *Geographical Journal*, October, 1890, Vol. XIV, No. 4. "Ocnography," by Sir John Murray, *Ibid.*, "Sub-oceanic Changes" by John Milne, *Geographical Journal* for August and September, 1897.

\* "Repairs to the South American Company's Cable off Cape Verde in 1861 and 1895" by Henry Benest, *Electrical Engineers' Journal*, May, 1897, Vol. XXV.

(To be continued.)

\* "Engineering," July 24th, 1903.

## LAW.

**Party Walls.—Important Action between Neighbouring Occupiers.**

THE BRITISH AND IRISH STEAMPACKET COMPANY, LIMITED, v. THOMAS HEAGNEY.

(Specially Reported for the I. B. and E. by Mr. W. Johnson Roberts, Solicitor.)

On the 16th and 17th inst. the case of The British and Irish Steampacket Company v. Heagney was tried before



The New Premises of the Defendant in Commons-street.

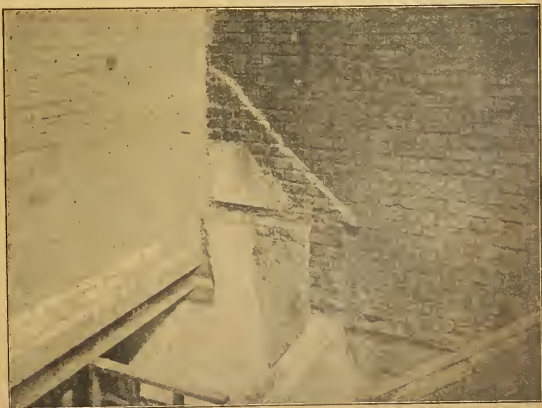
the Master of the Rolls. The plaintiffs claimed an injunction restraining the defendant, his servants, and agents from erecting and placing any building or structure upon or against the plaintiffs' buildings and premises situate at No. 3 North Wall, in the City of Dublin, and at the rear thereof, and from inserting joists or beams into the walls of the plaintiffs' said buildings, and from removing, breaking, or otherwise injuring the walls or roofs of plaintiffs' said buildings and premises, or in any way otherwise interfering with or trespassing upon the plaintiffs' said buildings and premises, and from continuing the erection of certain buildings and structures at the rear of the defendant's premises situate at No. 1 Commons-street, in the City of Dublin, now being erected by the defendant, upon and against the plaintiffs' said buildings and premises; and an order directing the defendant to pull down the said buildings and structures erected by him upon and against the plaintiffs' said buildings and premises, and remove all joists or beams inserted by him into the walls of the plaintiffs' said buildings for the purpose of carrying or otherwise supporting any of the defendant's said buildings or structures or otherwise, and the plaintiffs' said buildings and premises to the same condition in which they were prior to the erection upon and against the same by the defendant of the buildings and structures complained of. An inquiry as to damages and costs and other or further relief were also sought.

Messrs. Chas. Matheson, K.C.; Daniel Brown, K.C.; and M. G. Gibson, B.L. (instructed by Messrs. D. and T. Fitzgerald, solicitors), appeared for the plaintiffs. Messrs. J. O. Wylie, LL.D., K.C.; R. F. Harrison, K.C.; and Timothy Harrington, M.P. (instructed by Mr. W. Johnson Roberts, solicitor), appeared for the defendant.

Mr. Matheson, K.C., stated the plaintiffs premises at the North Wall are held under a lease for lives renewable for ever dated the 22nd day of June, 1799, to Lord Tyrrawly, Barrack Master General of Ireland, in trust for the King. The premises are described in said lease as "All that and those the lot or parcel of ground situate, lying, and being in the North Lotts, in the County of the City of Dublin, known by Lot No. 22; containing in front to Dublin Quay 49 feet, in depth to Mayor-street 500 feet, and in front to Mayor-street 49 feet, on which said William M'Anley and Michael Hughes have erected a dwellinghouse, warehouse and vaults, bounded on the north by Mayor-street, on the south by Dublin Quay, on the

east by Mr. Thomas Hodgins' holdings, and on the west by Lott No. 21, yet unoccupied, which said demised premises are more particularly described in a map thereof hereunto annexed, together with all and every the rights, members and appurtenances thereunto belonging, or in anywise appertaining." Plaintiffs were in possession of said premises since the year 1870. The present western boundary of same was an ancient wall which faced the rear of defendant's premises, No. 1 Commons-street. When plaintiffs purchased their said premises in 1870 the roofs of their buildings rested upon its full width, and their eaves gutters extended beyond it and overhung portion of the yard of defendant's premises in Commons-street; no other eave gutter rested upon or was supported by it. That state of affairs continued down to the time when defendant purchased the Commons-street premises, and placed a building upon portion of said wall and inserted joists and beams into it. These acts were done by defendant's builders, Messrs Conniffe and Dillon, in the execution of plans for the rebuilding of defendant's premises prepared by Messrs. Doolin, Butler and Donnelly. In March, 1906, plaintiffs discovered that the works being executed by the defendant included the erection of a new building, and that same was being erected by the defendant upon portion of the said wall and against same, and that defendant was inserting joists and beams into it. The plaintiffs' first intimation of what defendant was doing was the rain leaking through the roof of one of their warehouses, which upon examination was found to be due to the defendant having removed a number of plaintiffs' slates and having cut away portion of the wall upon which said slates rested in order to make a resting place or foundation for part of the defendant's new buildings. As soon as plaintiffs became aware of the use to which their wall was being put, and that the defendant had inserted several joists and beams to carry his new buildings into it, they on the 12th March last wrote defendant's builders pointing out what

they complained of, and asking them not to proceed further until a satisfactory arrangement had been come to. Defendant's solicitor, Mr. W. Johnson Roberts, on the 16th March, called upon plaintiffs' secretary, Mr. A. W. Egan, at the North Wall, and requested that the work should be allowed to proceed, and stated that in his opinion the wall was either defendant's sole property or was a party wall. After some correspondence between the parties plaintiffs issued a writ for injunction as before stated, and served at the same time a notice of motion for an interlocutory injunction pending trial. The hearing of this motion was by mutual consent agreed upon to be considered as the hearing of the case. Plaintiffs intend to rebuild their premises at No. 3 North Wall, which scheme of rebuilding will in all probability involve the rebuilding of said wall, and this cannot be carried out without great additional cost to plaintiffs and great risk of damage if defendant's new buildings remain in their present position, as the same would, if deprived of the support of plaintiffs' said wall, in all probability fall down. Defendant inserted a girder 14 inches into plaintiffs' 18-inch wall, and also beams supporting his floor. He opened two windows



View of the end of the Steel Girder entering into the Disputed Wall.





he would not have granted an injunction if it were proved that defendant's girder had penetrated the wall a couple of inches deeper than it should have done. Such injury might be regarded as so insignificant as to be beneath the dignity of a Court of Law. His Lordship scouted the idea that defendant's 51 foot plot should be measured from anywhere but the street face of the wall of No. 1 Commons-street. His Lordship also pointed out that the plaintiffs' measurements were definitely fixed by their lease at 49 and 500 feet respectively, while the defendant's lease measurements were 51 feet and 20 feet with the addition of the words "more or less," which seemed to imply that while the plaintiffs were fixed to the exact measurements demised by their lease the defendant might be entitled to something more. He held, moreover, that defendant had not, under the circumstances, by cutting away plaintiffs' slates interfered with their easement. He therefore refused the motion, with costs.

#### Main Drainage Contract. Claim for £36,000 in the Appeal Court

In the Court of Appeal last week, before the Lord Chancellor, Lord Justice FitzGibbon, and Lord Justice Holmes, the arguments were concluded in the case of Pearson v. Corporation of Dublin. The action was brought by Messrs. Pearson, the well-known contractors, of Victoria-street, London, against the Corporation of Dublin, to recover £36,000 for work done in connection with the contract for the erection of precipitation tanks at the Pigeon House Fort, for the Main Drainage Scheme. The contract price was £94,000, but the plaintiffs had to do extra works, involving the additional cost now sued for, and they alleged that they were induced to enter into the contract at £94,000 by misrepresentation as to the depth of the harbour wall, it being represented to be 9 ft. below Ordnance datum, whereas, as a matter of fact, it was practically coincident with Ordnance datum. The defendants denied that there was any misrepresentation, and made the case that the plaintiffs were bound by the contract, and, further, that the plaintiffs entered into a new contract in June, 1900, when the full particulars of the facts as to the true state of the wall were within their knowledge. The full amount of the original contract price had been paid, and also sums agreed upon. On the hearing of the action before the Lord Chief Baron and a special jury, the Lord Chief Baron, at the close of the plaintiffs' case, directed a verdict for the defendants. On application by the plaintiffs to the King's Bench Division for a new trial, that Court, the Lord Chief Justice dissenting, held that the Lord Chief Baron was wrong, and directed a verdict to be entered for the plaintiffs, with costs of the trial and argument. From that decision the defendants now appealed.

Mr. Serjeant Dodd, K.C., M.P.; Mr. Charles O'Connor, K.C.; Mr. Ignatius O'Brien, K.C.; and Mr. Philip White (instructed by Mr. Ignatius Rice) appeared for the Corporation (appellants). Mr. J. H. Campbell, K.C., M.P.; Mr. John Gordon, K.C.; Mr. T. M. Healy, K.C., M.P.; and Mr. E. A. Collins (instructed by Mr. George Collins—Messrs. Casey and Clay) appeared for Messrs. Pearson (respondents).

Mr. John Gordon resumed his reply on behalf of the respondents. In the course of his observations—having dealt with various technical points of the contract—he said that what he wanted was to get the jury to consider, amongst other matters, whether there was any new contract. He would then be satisfied. There was no new contract; nor was there accord and satisfaction, if there were he would be out of it. But, as to the water getting through the wall and so forth—that was a matter for the jury—and the advantage they get from this new work may be a matter for the jury. But that was the point made and argued by the other side, and relied on by the Lord Chief Justice. The Lord Chief Baron did not agree with the contention that there was a new contract. His client was weighted with the old contract, which had been obtained from him by fraud; and he was, therefore, no free agent. He did not fix the prices—the engineer did. The Lord Chief Justice had been entirely under a misapprehension when he said the object of the "new contract" was to create a different basis of operations. Was there any evidence or foundation for this new contract? "It was to put in a new backbone." There was no evidence of this. What his client said under the circumstances was, "I must carry out this thing; and see how it can be best done." The advantage of the north harbour wall's existence had not been secured to him—because it was not there. But, this was a new contract for a new and different construction! Counsel said there was no new construction. The Lord Chief Baron did not consider there was. There was no foundation, or evidence, or document proving that there was; but, on the contrary, every single document, every single fact, and every single

piece of evidence negated the idea of there being a new contract. If there was no new contract was not there an end to the case altogether? There was one thing more: the Lord Chief Justice referred to this work as having been done well. There was no suggestion but that it had been completed and carried out, and that everything undertaken to be done had been done. His clients had been put to serious loss.

Lord Justice FitzGibbon—As a matter of personal information, how far has the Main Drainage been completed?

Mr. Gordon—Mr. Kaye Parry says the drainage is exactly as it was.

Lord Justice FitzGibbon—I don't think he is right, for a number of the outlets into the Liffey have been closed.

Mr. O'Brien—The only thing remaining undone is that the sewage has to be treated with lime water. The delay was due to the Local Government Board. At the present time the sewage runs as before.

Lord Justice FitzGibbon—It is not a question as to delay at all—but it is just as well to know.

Mr. Gordon—I was thinking Mr. Kaye Parry was right. Resuming, counsel said Sir Alexander Binnie had stated that his clients' work was splendidly done. Messrs. Pearson had been put to enormous expense. And, although they were not entitled to have the law strained, they came in not wanting to shirk their responsibilities. His clients had discharged them. They had given a great many pieces of evidence, not merely to contradict the contention of the other side, but to show that the whole cause of action was one of fraudulent misrepresentation. If there were evidence to go to a jury let it go.

Mr. O'Connor having briefly replied, Judgment was reserved.

N.B.—The case having ended on the last day of term, judgment will not be given until after the opening of next term.

#### OUR ILLUSTRATIONS.

##### Proposed Methodist Church and School Buildings, Lisburn Road, Belfast.

Our illustration this week is of the N.W. Methodist Church and Schools situated on the Lisburn Road, Belfast. The School buildings have just been completed, and are to be opened on the 10th June. The walling is of uncoursed squared rubble stone from Ballycullen Quarry, with white Scotch stone for quoins. The tracery of large window in gable, the dressings of other windows, and the entrance door are of red stone. The internal dimensions of the hall are 52 ft. by 34 ft. wide. In addition, a classroom and vestry are conveniently placed at the rear with sanitary accommodation. The internal joinery and the seating of hall is of selected pitch pine. Ample ventilation is provided, and is under control. The heating contract has been carried out by Messrs. Musgrave and Co. The leaded lights are executed by Campbell Bros., and gasfitting by Paul Ross and Co., of Belfast. The general contractor for the work was Mr. Thomas McMillan, Belfast. The building now completed cost £1,370, inclusive of heating, lighting, drainage, fencing, and wrought iron gate. The architect is Mr. St. John Phillips, A.R.I.B.A., Royal Avenue, Belfast.

Messrs. Meldrum Bros., Ltd., have also secured an order from the Municipality of Pretoria, South Africa, comprising one 4-grate unit with large boiler, containing buildings, etc.

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## THE NEW LABOURERS' ACT.

Greeted with a chorus of unanimous approval, this long-expected Bill was introduced by Mr. Bryce into the House of Commons on Monday night in a clear and comprehensive speech. The measure is of vast importance. Under the previous Acts some 17,500 cottages have been built and many more sanctioned. The beneficent objects of the Labourers' Acts have been so often referred to in these columns that it is needless to again refer thereto. The main defects of the previous legislation were the slow, cumbersome, stupid, and costly procedure; the vexatiousness and delay in carrying out the statutory requirements and the oppressive legal charges involved. Most of these defects have to a great extent been removed by the new Bill. The Bill proposes three principal changes—a reduction of cost of procedure; giving the Local Government Board power, in the default of the Rural Councils, to appoint an officer for the preparation of schemes; and amending the Land Purchase Act to enable Commissioners to make advances under the Labourers' Act in a more practicable form than at present. In addition to the twenty thousand cottages built or sanctioned, the Bill contemplates 25,000 additional houses, while four and a quarter millions sterling will be made available for loans. To assist in the payment of annuities on this sum the Petty Sessions' Clerks' Fund, the Development Grant, extinguished judgements, and a reduction of the Lord Chancellor's salary, amounting in all to £22,300, would contribute; while the Treasury grant of £28,000 brings the sum up to £50,000 a year, to which £65,000 estimated annual rents have to be added, leaving the local rates to bear £23,000 out of the total, £138,00. The repayment of the loans has in the past not placed any

serious burden upon the rates, there being a Treasury grant annually divided amongst local authorities putting in force the measure, which, taken with the rents, almost defrays the re-payment charge. The statutory limit for a rate under the present Labourers' Acts is 1s. in the pound, and in a couple of typical districts, as mentioned in a letter in the present issue, the Rathdown (South County Dublin and North Wicklow), although about eighty houses have been built, the charge upon the rates is only .8d. in the pound. In North and South Dublin Unions it is but slightly higher, while in the Omagh Union, where nearly 200 houses have been built, there is no charge upon the rates, the rents, with the Treasury grant, sufficing to defray the annual repayment charge on the loan. In some of the Southern Unions, such as Cork, Limerick, Middleton, Macroom, etc., where many hundreds of cottages have been built, and where rents are in some cases in arrear, the annual charge has gone as high as 7d. or 8d. in the pound; but this is the exception, not the rule, and it can hardly be contended that, say, 1d. in the pound constitutes a very heavy burden, even in a very poor Union. It should also be borne in mind that no less than £27,000 of the old grant remains unclaimed, unallotted, and still available for the purposes of the Act. So much for the financial aspect of the case; the practical benefit and general effect in rooting the peasantry to the soil cannot be overrated.

The question of the architectural supervision of the building works has always been a most vexed question. Protest has again and again been made by architects that in too many instances ignorant and unqualified men have been employed for the sake of a doubtful cheapness, but so far without avail, as the Local Government Board, the controlling authority, has always pleaded want of powers to deal with this defect. Yet, strange, only the other day the chairman of the Cavan Rural District Council announced that he had heard with surprise of a statement by the Local Government Board with regard to Mr. O'Brien, the guardian's architect. He went on to say that "he thought Mr. O'Brien's appointment as engineer in Bawnboy Union for a labourer's cottage scheme was sanctioned by the L.G.B., and it was more than surprising now to find them coming in at the eleventh hour and saying he was not qualified. As far as he could judge he was afraid the only qualification he lacked, with regard to the local Government Board, was that he was not a Freemason. He thought there was something at the back of it that did not appear on the surface. Mr. O'Brien carried out a scheme for the Bawnboy Union five or six years ago, and if he were not a qualified engineer why did not the L.G.B. find it out then, or why did they let him carry out the scheme? There must be some wire-pulling at the back of all this, and it was the duty of the board and of the Council to fight it out to the bitter end and not allow this wire-pulling and red-tapeism between their officials and the L.G.B. to interfere with them in the discharge of their public duty." We are quite ignorant of the merits of this particular case, as we know nothing of this gentleman's suitability for the responsible post he holds, or whether he has any claims to be called an architect or not, but at the meeting in question the Clerk read a former letter from the L.G.B. which stated that there is no evidence before them to show that Mr. O'Brien is qualified as an architect or engineer, and that they could not therefore sanction his appointment in such capacity. They, however, are prepared, if the guardians so wish, to sanction Mr. O'Brien's appointment as Clerk of Works for the Union. Now, any effort to raise the status of the men retained as architects, and to secure reasonable qualifications being possessed by such officials, we are in hearty sympathy with, and we have always urged that, whether the Local Government Board have

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or have not arbitrary powers to refuse to sanction such appointments, a well-directed effort and strong pressure on their part would effect incalculable good in a matter in which millions of the ratepayers' monies are involved; but we confess it seems a little strange that this newborn energy upon the part of the Board should be manifested on the eve of the introduction of a measure in connection with which Mr. Bryce proposes to dispense with the services of architects, for that is what his statement amounted to when he announced "that the Local Government Board proposed to make matters still simpler by issuing uniform forms which the County and District Councils could use, and also to issue model plans of cottages under which architects' charges might be greatly reduced." The recent action of the L.G.B. in vetoing the appointment of Mr. O'Brien seems a little hard on him, whatever his merits or demerits may be, for it makes a scape-goat of him, while many men who have never built a house are allowed to act as architects and engineers to District Councils.

The proposal of Mr. Bryce that the L.G.B. should supply stereotyped plans of cottages, and so save the Councils architects' fees, indicates at once that he can have but little conception of the practical working of a scheme of building under the Acts. It is hardly possible to conceive any class of work in which it is more essential that qualified, practical, and experienced men should be responsible for. From the time the sites are visited, advised on, marked on the maps, houses designed, estimates and specifications prepared, inquiries attended, countless formalities complied with, enlarged maps made for arbitrators, visits to sites with inspectors and arbitrators, to the time when the contracts are let and the sites surveyed and measured out, and an unwearying, constant, careful supervision of a large scheme scattered over a wide area, oftentimes committed to the tender mercies of careless, incompetent, and sometimes dishonest, contractors of no financial resource, on to the day when the houses are occupied, and even then the architects' responsibility does not end for long after the maintenance period has passed, he is held accountable for any defects that may arise.

Apart from the difficulty of designing a cheap, roomy and slightly cottage at small cost, the office of architect to a promoting authority is an onerous and extremely responsible one. The effect of Mr. Bryce's proposal, if adopted, will be that all qualified architects now engaged on this work will be dispensed with, and the supervision of the buildings erected from the stereotyped plan and specification entrusted to any local handyman who can rely on a few supporters at the Council meeting. In abolishing responsible and qualified supervision and design, Mr. Bryce is rendering the ratepayers a poor service, and at the same time slighting most unnecessarily the profession of architecture. The highest fee that an architect could claim would represent so insignificant a fraction of the total cost that it is difficult to see where the benefit to anyone concerned could come in through this alleged economy, while the positive disadvantages and the possibilities of fraud and incompetence are manifold. Rather should Mr. Bryce have aimed at raising the level of qualification and the introduction of statutory powers whereby the L.G.B. would be fully enabled to legally veto the appointment of unsuitable persons as architects, and to insist upon the employment of properly qualified persons.

The matter was brought before a general meeting of the Royal Institute of Architects on Tuesday by Mr. C. H. Ashworth; as a result a sub-committee, consisting of the President, Mr. Ashworth, and Mr. Butler, was appointed to consider the matter and report to the Council what steps they would recommend should be taken.

We have refrained from referring to the injustice of depriving without compensation a considerable body of men of their employment, because where a matter of public policy is involved such matters seldom receive consideration.

The achievements of other Government Boards in providing stereotyped designs have not been so conspicuously successful as to encourage an extension of the practice: not only is it demoralising to the local recipients, but it has resulted in the erection, for example, of schools throughout the country admittedly the worst of any civilised nation. If further economy is desired, the direction to make it in is in the cost of the legal procedure, which to the promoting authority is sometimes as much as £10 per cottage, exclusive of the cost of opposing owners' solicitors.

## COMMENTS.

### The Law of Party Walls.

In this issue we publish a report specially written for the *I.B. and E.* of a case recently decided by the Master of the Rolls in reference to an alleged trespass. The dispute arose between two neighbours, as more particularly detailed in the report, in respect of the action of the defendant, who recently rebuilt his premises. It was alleged by the plaintiffs that defendant had committed a trespass upon a wall claimed by plaintiffs as theirs by building thereon; defendant replied that this wall in question was his by the measurements of his lease, and, further, that if it was not his, then it was at least a party wall, and he was entitled to the use and enjoyment of half of it; further, that in any case the wall where it formed the back wall of his premises, had an offset of 6 inches at the lower storey, and that he had only continued the exercise of the rights of easement established by his predecessors in title in using that offset in order to build thereon. The plaintiffs replied that even supposing the defendant had an easement to build upon this offset, he had, nevertheless, only acquired a right limited to that particular position to build upon, and had no right to extend it to a wider dimension that he had previously utilised. Defendant relied upon a lease map which gave him 51 feet depth from front to use; this would include the wall. Plaintiff replied that defendant's outside measurement should be taken, not from his own front wall, but from a step in the street belonging to an adjoining house which, if included, would practically give him the requisite 51 feet, while the plaintiff had more than his lease measurement of 49 feet. The question, therefore, was one of facts rather than of law. Both parties had elaborate models, but defendant's being to a large scale and coloured freely was very explicit and clear; the defendant was, moreover, prepared with every measurement likely to be required, and had carefully examined all the easements likely to substantiate his contention that the wall in dispute was a party wall, and not the property of the plaintiffs, as alleged in the claim. In the result, the Master of the Rolls held with the defendant that the wall was a party wall, and, as set forth in our special report, commented upon the different kinds of party walls that are recognised in law, namely, walls in which either parties have equal rights to utilise half the width of the walls, and others in which the rights are not so limited, but in respect of which the parties have equal rights to utilise the walls for their full depth or thickness for any and every use to which walls are capable of being put, *e.g.*, both parties in this case had equally a right to put their joists or beams right through the full thickness of the wall, as had, in fact, already been done by the plaintiffs, in two or three cases in respect of beams. The whole case turned upon facts and measurements rather than on abstract points of law, although Dr. Wylie, K.C., for the defendant, cited two important cases touching the law of doubtful party walls, and the Master of the Rolls held with him—the reference is given in our special report, and goes to show that where use has been made for any length of time, of the wall in

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dispute, and where there is doubt as to its origin and ownership, the law assumes it to be a party wall.

The only points to be deduced from the case are (a) the further establishment of the above cited principles that where the ownership of walls dividing two premises cannot be ascertained the law favours the presumption that they are party walls; (b) the great value of extreme accuracy in measurement, and exhaustive examination and well prepared models and photographs in such cases; (c) and the facts that courts of law are indisposed to allow the expensive machinery of Chancery procedure to be put in motion for wrongs admittedly of a trivial nature.

In addition to the foregoing causes of complaint, the defendant had admittedly cut off portion of plaintiffs' eaves gutters and slates which overhung his premises, and which constituted an undoubted easement over his property. Yet, defendant did no more than was his right under the Dublin Corporation Act, and had he observed its provisions as regards notices, etc., might have bid defiance to all adjoining owners; he, however, neglected to serve the prescribed notices, and so cut himself off from the benefit of an act which was, in part, specially designed to remove some of those anomalies of the law which still subsist in respect of such matters. It was not even thought worth while to contend on his behalf that he had really not excluded himself from the benefit of the Corporation Act, but it was at one time suggested that inasmuch as the Act provided a penalty for exercising any of the rights conferred upon building owners by its provisions, without due notice to adjoining owners, then if the buildings were proceeded with the owner was liable to a penalty only, and that the infliction of the penalty would condone the neglect to serve the statutory notices. Against this it was necessary to remember that the penalty was only as between the building owner and the Corporation, and did not affect the case as between the building and adjoining owners. In other words, a man who neglected to serve the statutory notices absolutely cut himself off from the rights he otherwise would have had under the Corporation Act and became a common trespasser.

The case was a difficult one to report, as it turned chiefly on an exhaustive examination and comparison of the measurements in the various leases, therefore the question before the court was almost purely a question of fact. It was necessary in our report, however, to state these rather fully so that the reader might be able to see on what facts the court would presume a wall to be a party wall. The only question of law seems to be as to defendant's action in cutting off the plaintiffs' slates, which, it was alleged by prescriptive right, overhung his (defendant's) yard, and substituting therefor a lead gutter. The Master of the Rolls held the injury to be so slight as to be beneath the dignity of a court of law, and (although he did not state so directly) that defendant was justified in substituting for an existing easement one of a similar nature. The only other law point in the case was that the Master of the Rolls agreed to the proposition of defendant's counsel that where the history and ownership of an ancient wall dividing two premises, the property of different owners could not be proved that the presumption of law was that it was a party wall. The Master of the Rolls explained the different kinds of party walls, differentiating between the party wall paid for equally by the two adjoining owners and owned absolutely as to half by each of them, from the party wall owned in common by both, and over which both have co-extensive rights to the use of the entire of it. He held defendant's wall to be of the latter class. We mention these facts and deductions so that our readers may realise, if possible, the facts upon which the Master of the Rolls based his judgment.

In this particular case the plaintiffs had actually, in a previous action (Ryan v. B. and I. Steampacket Co.), tried before that eminently painstaking and able judge, the late Mr. Justice Lawson in 1880, established their rights to the entire ownership of the wall. What the evidence in that case was cannot be ascertained, the judgment merely being put in evidence. We mention this previous case as showing the danger of taking up the position of plaintiff in cases of the kind, as the onus of proof of ownership lies on the party making the claim,

and Ryan's case shows how the (then) defendants and victors became the losers when they adopted the responsible, perilous role of plaintiffs.

In his judgment, the Master of the Rolls recounted a very interesting incident which happened within his own personal knowledge, which tended to show the fashion in which, even during comparatively recent times, the value of land has gone up at the North Wall. Years ago the owner of one of the lots into which this district was parcelled out by the Corporation, placed so little value on his interest that he offered it as a present to a friend, subject only to his paying the rates and taxes on the property. Subsequently, portion of that interest was sold for £5,000, and the owner derived £100 per annum out of the balance. Unfortunately for himself, his lordship's friend had declined the offer.

The diagram plan, and reproductions of two photographs which we publish, sufficiently explain the surroundings of the case to make our report and comments intelligible to our readers.

#### A Revival in the Building Trade!

Speaking in the House of Commons last week, Mr. John Burns, President of the Board of Trade, referred, with emphasis, to a revival in the building trade, which, he said, was improving rapidly and showing a disposition to share in the prosperity general in other branches of industry. It need hardly be said that, assuming Mr. Burns' remarks to be well founded, his description could not have included the state of affairs in Ireland. On this side of the Channel building operations are most certainly not improving rapidly. On the contrary, the slump that has prevailed for so long shows few, if any, signs of passing off. There is absolutely no encouragement for speculative building, the number of large contracts on hands is small, and the prospects of future operations on any considerable scale are not rosy. Ireland cannot, therefore, have been in the Board of Trade President's mind's eye when he spoke so confidently of a building revival. This country, however, is such a comparatively small factor in the sum total of Great Britain's prosperity that Mr. Burns may have been amply justified from the state of the trade in England. Now, turning to trustworthy reports which reach us regularly, we find that such is not the case. In London and the South of England building operations continue stagnated, and while conditions in the Midlands and North are not quite so bad, they are still far from satisfactory. From Scotland we learn that, so far as house letting is concerned, this season has been one of the worst on record, all classes of property being affected, so that building is practically at a standstill. Under these circumstances it is difficult to see where Mr. Burns got his information. That building will improve is, of course, almost a certainty, if for no other reason than that it can hardly remain at such a low ebb as it has been. After such a long period of restricted operations there must be an improvement, but from present conditions the depression will continue until money becomes cheaper than it is now. While money is dear speculators will not be inclined to invest in small house property, and, unfortunately, the great rise in local rates, which is such a marked feature of modern municipal government, everywhere acts as a further deterrent. Mr. Burns' sources of information would seem to be no better than those at the disposal of most of our Government departments.

#### The Society of Architects' Travelling Studentship

The Council of the Society of Architects, London, who recently established a travelling studentship prize, announce that twenty-seven sets of designs have been received from students of the Society in competition for the above, and the Council has placed first the design marked No. 6.

The author is Mr. Victor H. Grist, 4 Marlboro'-avenue, Reading, who thus becomes the first holder of the Society's Travelling Studentship, which is of the value of £25, and carries with it the silver medal of the Society.

The competition was well supported, and many of the competitors' work displayed much merit, though the examiners note that a large number of them had disregarded the limits of cost.



## ALPHABETS OLD AND NEW\*

There are few architectural compositions in which an inscription in some shape or form does not find a place. The interest and historical value of such records depends mainly on their accuracy, diction, and the importance of the circumstance itself which is recorded; but the artistic and picturesque interest is largely enhanced by the character of the type and form of lettering employed. The difference between an ordinary sign painter's characters and a series of well-proportioned letters, nicely balanced and spaced, is almost incredible, and to appreciate it one must see examples of either side by side. If this be true of actual buildings, much more so is it of drawings. The effect of the nicest drawing is often destroyed by clumsy, badly-proportioned, ill-drawn lettering. The art of lettering nicely and gracefully is worth acquiring by the draftsman. There has been a vast improvement, but many, in their desire to be original, become cryptic, ungainly, and almost disgusting in their eccentricity. Mr. Batsford has just brought out a popular little book, by Lewis F. Day, under the title which heads these few remarks. The position of Mr. Lewis Day in the art world is a sufficient assurance that he is a safe guide in this matter. Long ago the printer's art was viewed from an artistic point of view, and many of the old founts of type, no less than the old manuscripts, afforded examples of beautiful letters. The early Victorian era closed that phase and set the fashion of ugly and purely commercial forms of type. Type nowadays dominates the forms of lettering for all purposes, and it was not until William Morris and a few others (amongst whom John Ruskin must not be denied mention) arose and gave attention to the matter, that marked improvement was noticeable.

Mr. Day has, in the present work, written an interesting introduction, and has filled the volume with a fine collection of the most clear and beautiful alphabets. We know of no book which so competely fulfils this purpose; there is not an ugly letter in the book, and to the architectural and engineering draftsman, the sign writer, the type founder, the carver, and the craftsman of every description who has constantly or occasionally to draw or inscribe letters, it is cordially to be commended.

**The Prince of Wales' Visit to India.**—Considerable public interest was centred on the return of the Prince and Princess of Wales from their prolonged trip in the East. H.M.S. "Renown," which carried the Prince and Princess, had for the voyage been practically changed from a battleship to a yacht. She was decorated throughout, and painted from stem to stern with Messrs. Harland's "Snow-white" and Royal Marine green Enamels, which have stood perfectly the six months' exposure to sea, air, and water, and a tropical sun. The ship presented a beautiful appearance in her snow-white coat of Enamel, a sharp contrast to the normal and ugly grey drab of the navy.

A noticeable feature of the Dublin quays at the present time is the large amount of native timber that is being exported. It is perfectly evident that the country is being rapidly cleared of the remains of its standing timber, and, as everyone is aware, no replanting is being done. Therefore, although there is plenty of talk about reforestation, the exact opposite process is in full swing, and is almost certain to continue. This means that in the course of a few generations the forest lands of Ireland, few as they are, will be considerably depleted, and the evils of a treeless country enormously accentuated. As we have often pointed out, the reforestation of the country to be successful must not be left to private enterprise, and it is therefore of the highest importance that the Irish representatives in Parliament should press the matter on the Government. Mr. William Field has shown himself deeply interested in this subject, and it is to be hoped that the efforts he has already taken, and those which, no doubt, he has in contemplation, will speedily result in something tangible being done.

Meanwhile there is now a Royal Commission on railways and canals, and the development of these latter is closely bound up with the success of afforestation. Assuming that Ireland were made a timber-producing country the industry would depend for its success on cheap internal transit, and this can be best provided by a good system of canals. Hitherto internal waterways have in these countries been scandalously neglected, and there is no doubt that the effect has been disastrous to the trade and prosperity of Ireland. If practical results follow from the Commission they should take the form not only of the development of existing canals and the construction of new ones, but also of the installation of boats equipped with modern motors.

## OUR SOUTHERN LETTER.

(FROM OUR CORRESPONDENT).

## Railways.

The Select Committee of the House of Commons, after proceedings extending over ten days, have decided that the preamble of the Cork City Railways and Works Bill has been proved, and that the Bill be sent back to the House of Commons for the third reading subject to certain clauses being amended, and provided that the Board of Trade conditions are conformed with.

It may now be considered that the Bill has virtually passed, unless some members succeed in blocking the measure.

There seems to be no doubt that of the three schemes the above is the best, as it is both the simplest to construct and the cheapest, and as a set-off against the objection of the line running on the street level the promoters propose to construct a new street from the north side to the south side of the city across the proposed bridges opposite the terminus of the Cork and Bandon Railway, which will be an immense advantage to the city and relieve the congestion of the traffic in King-street.

At an early stage of the proceedings the Cork and Waterford Railway Bill was withdrawn. This was a high-level scheme, being the most costly of the three, and included a junction from Youghal to Cappagh. This latter part of the scheme would have given an alternative route to Dublin via Dublin, Wexford and Wicklow Railway.

The Links Railway Bill comprised both a high-level and low-level system. This scheme would cost nearly double what the City Railways scheme could be constructed for, and the bridges being two-deckers would cause more obstruction to the traffic, and also the approaches from the high-level system to the Cork and Bandon, and also to the Great Southern and Western Railway's termini, would be on down gradients, which these respective companies objected to.

The only substantial objection brought forward to the City Railways scheme was by the Clyde Shipping Company, through whose premises the railway is to be taken on a six-chain curve.

The promoters towards the end of the enquiry agreed to settle with this company by obtaining for them compensation areas, and also paying them a sum of money towards their Parliamentary costs.

The scheme will cost about £100,000, and if passed the promoters will give an undertaking to proceed with the works immediately.

The financial part of the scheme has been placed on a sound footing. The Treasury will grant £25,000, the Harbour Commissioners undertake to provide £10,000, and the Cork, Bandon and South Coast Railway Company promise £15,000 and the Great Western Railway of England undertake to find the balance and to see the work through.

The Harbour Commissioners will apply to Parliament next year for powers to construct the sidings on the quays, which sidings are included in the Cork City Railways Bill.

The Parliamentary estimate includes £16,000 for lands and premises to be purchased. This sum will probably be exceeded. The estimate also allows only £20,000 for each of the bridges for railway and road traffic, which seems too little.

One difficulty to be dealt with in constructing the bridges is the low level of the quays, as at high water spring tides, with an easterly wind, the water comes up to the level of the quays when there is any appreciable freshet in the river.

## General.

The Cork Co. Council have under consideration the following works:—The enlargement, extension and improvement of the Council Chamber in accordance with the plans and specifications of Messrs. W. H. Hill and Sons, Architects, and approved of by Mr. S. A. Kirkby and Mr. R. W. Longfield, County Surveyors, at a probable cost of about £1,200. Also the construction of a pier at Cahirkormack at a probable cost of £450.

The Cork Rural District Council have accepted the tender of Mr. Daniel Twomey, Rowgurrane, for the construction of Knockraha Waterworks for the sum of £310, wisely adding the clause "without any extras," and have decided to employ a clerk of works for three months at a salary of £2 2s. per week.

The Fermoy Rural District Council have received a communication from the Commissioners of Public Works sanctioning the loan of £800 for the water supply of Coum, which work is under the process of construction. They also propose to expend the sum of £185 in providing a water supply for Clondulane.

\* "Alphabets Old and New," for the use of craftsmen, with an introductory essay on "Art in the Alphabet," by Lewis F. Day, Second Edition; Revised and enlarged. London: N.T. Batsford, 94, High Holborn, 1906.

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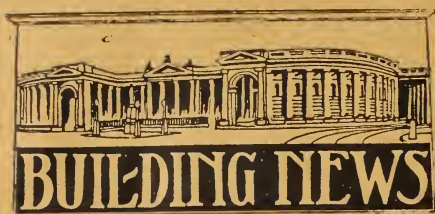
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**Cork.**—Tenders are invited for the erection of a new officers' mess at Cork Barracks, in the Cork District. The drawings and specifications may be inspected, and bills of quantities with form of tender obtained, at the Barrack Construction Office, Cork Barracks.

**Crossna.**—The dedication of the new church at Crossna, near Boyle, was performed by the Most Rev. Dr. Clancy, Bishop of Elphin. The edifice is Romanesque in style, and built by Messrs. Fee, Longford. The architects are Messrs. W. H. Byrne and Son, Suffolk street, Dublin.

**Celbridge.**—The Board of Works have intimated that they are prepared to issue the first instalment of £1,000 loan for the building of cottages in Celbridge No. 1 District Council.

The Board of Guardians of the Union received tenders for the erection of a greenhouse, in accordance with plans and specification prepared by Mr. J. J. Inglis, C.E., 18 Nassau-street, Dublin.

**Clough.**—Estimates are required for the following works to be executed at Clough Church for the Rev. John Roe, P.P.:—New roof, etc., complete with eave gutters and down pipes; new buttresses, new cut stone barge courses, crosses, etc., and gables raised for new roof. Messrs. W. H. Byrne and Son, 20 Suffolk-street, Dublin, are the architects.

**Cloghroe.**—The Guardians of the Poor of the Cork Union received tenders for repairs of Dispensary House at Cloghroe.

**Dublin.**—Mr. J. P. Conniffe, 9 Grace Park-avenue, Drumcondra, has been declared contractor for the rebuilding of Mr. Coghlan's new premises at the corner of Wicklow-street and South William-street. The plans were prepared by Mr. Francis Bergin, B.E., architect, Westmoreland-street.

**Desert.**—Tenders were received for re-slating the roof and executing other improvements at Killolemon, Desert, for Captain J. E. Longfield, J.P. Messrs. W. H. Hill and Son, 28 South Mall, Cork, are the architects.

**Enniskillen.**—Tenders were received for building two houses, semi-detached, at Springfield. Mr. William Scott, architect, Victoria-terrace, Enniskillen.

**Kingstown.**—J. P. Conniffe, 9 Grace Park-avenue, Drumcondra, has secured the contract for building of new chapel for the Little Sisters of the Assumption. Mr. Francis Bergin, B.C., is the architect.

Messrs. Edward Lee and Co. have considerably extended their scheme of re-building in Upper George's-street, Kingstown, and Messrs. J. and R. Thompson, of Dublin and Belfast, have received instructions to proceed with the erection of six additional shops and houses, under the supervision of and to plans prepared by Messrs. Kaye-Parry and Ross. The amount of this second contract will be about £7,000.

**Letterkenny.**—Tenders were received for the erection and completion of a dwelling-house in Treankeeel. Mr. M. O'Callaghan, Main street, Letterkenny, is the architect.

**Mullingar.**—Tenders were received for the building of dwelling-house and shop at Dysart, Mullingar, for Mr. Coffey, according to plans and specification of J. F. Robins, Moate.

**Naas.**—The estimate of R. E. Mellon, Brighton Building and Engineering Works, Rathgar, has been accepted for the carrying out of the extensive alterations and additions to "Roseboro'" Naas, Co. Kildare, under the directions of R. Caulfield Orpen, B.A., Architect, 13 South Frederick-street, for Lady Albreda Burke.

**Tinahely.**—Tenders are invited for the repairs of Kilcommon Church, Tinahely. Particulars to be had on application to Mr. W. Taylor, Tinahely.

**Tullamore.**—The Council of the Tullamore Urban District will, on the 6th June, consider tenders for the repairs to residence of caretaker of waterworks at Clonaslea, according to the specifications prepared by the town surveyor which can be seen at the boardroom, Tullamore Workhouse.

The Council of the Tullamore Rural District will, on the 12th June, consider applications from qualified persons, for the preparation of plans, specifications, and estimates, and the superintending and certifying of all repairs and works in respect of labourers' cottages, public pumps, burial grounds and sewers in the district.

## CORRESPONDENCE.

## The New Labourers Act.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—An editorial comment on the new Labourers' Bill, introduced into the House of Commons, which appeared in the *Irish Times*, it was stated that the working of the Act has laid a great burden upon the local rates. As this view is a somewhat prevalent one, I venture to point out that its accuracy or otherwise entirely depends upon what meaning is attached to the expression "heavy" in relation to the rates. I may also mention that the statutory limit for such a rate is 1s. in the pound, but I am not aware that any Union in Ireland has ever reached this limit. To take a couple of typical districts, the Rathdown (South County Dublin and North Wicklow), although about eighty houses have been built, the charge upon the rates is only 8d. in the pound. In North and South Dublin Unions it is but slightly higher, while in the Omagh Union, where nearly 200 houses have been built, there is no charge upon the rates, the rents, with the Treasury grant, sufficing to defray the annual repayment charge on the loan. In some of the Southern Unions, such as Cork, Limerick, Midleton, Macroom, etc., where many hundreds of cottages have been built, and where rents are in some cases in arrear, the annual charge has gone as high as 7d. or 8d. in the pound; but this is the exception, not the rule, and it can hardly be contended that, say, 1d. in the pound constitutes a very heavy burden, even in a very poor Union. It should also be borne in mind that no less than £27,000 of the old grant remains unclaimed, unallotted, and still available for the purposes of the Act.—Yours, etc.,

R. M. BUTLER, Architect.

12 Dawson-street, Dublin.

## THE METHODIST CHURCH.

At a recent meeting of the General Committee of Management, chapel affairs were reported on by Rev. W. B. Lumley, and it was recommended that permission be given to erect a new church and schools at Donaghadee, at a cost of £3,500, on condition that two-thirds of the cost be subscribed. Sanction was given to the renovation of Salem Church, Belfast, at a cost of £1,800. The alteration of Grosvenor Hall, Belfast, and the erection of a new annex, specially for social work, at a cost of £4,500, was also approved. A large number of minor cases of renovation and repairs of the church property throughout the circuits were considered and approved, and proportionate grants were recommended to meet the expense.

There has recently been built in Paris a house, the Des Moines Savings Bank, which embodies a new method of construction. The framework is of steel and the walls of glass. The latter is white, resembling marble, and about 1 inch thick. It is strengthened with an inserted wire screen after the fashion of re-inforced concrete, and great strength is claimed for it. At first the great difficulty was to shape the glass to the various sizes required, but that is now surmounted by the invention of a Belgian, M. Fourcault, who has devised a process which will make the glass take the required shape. He has sold his patent for £190,000, so that there are evidently some who believe there is something in his invention. The celebrated French astronomer, Prof. Flammarion, declares, according to "Science Siftings," that the days of brick and timber houses are numbered, as people will refuse to live in them preferring these new ideal glass and steel structures. W shall see.

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# ENGINEERING SECTION.

## ITEMS.

The annual report of the Belfast City electrical engineer shows that there was a nett profit of £6,692 on the electric light undertaking, and a nett loss of £7,371 on the tramways for the year ended March 31st last. The balance of the two schemes is on the wrong side of the ledger, but the few electrical tramways have not been on trial for a sufficient period to enable an opinion to be offered as to their paying capacity.

Last winter the Urban District Council of Portrush called a Messrs. Swiney and Croasdaile, M.M.Inst.C.E., of Belfast, to advise them as to the best means of improving their water supply. We understand the Council has just had a meeting with Mr. Swiney to consider the report, and has decided to act upon it at once. The same firm has been asked to advise the Council upon the disposal of the sewage from the southern end of the town, which has been giving rise to numerous complaints.

The De Forest Wireless Telegraph Co. have opened an office at Leatle, and it is understood that another station will be erected at an early date at Cape Flattery. Messages or transmission across the Pacific will be sent from San Francisco, via the Hawaiian Islands, large installations being under construction at both points. Some of the leading engineers in this company recently conducted a long and exhaustive series of experiments at Glangriffie, Co. Cork, and subsequently at Cahirmore, but owing to the inclemency of the season, high winds prevailing at the time, and other causes, the results did not appear to be of an entirely satisfactory nature, as far as could be locally ascertained.

The Cardiff Corporation has recently been experimenting with steam motor waggons for the collection of house and street refuse. It was understood through the media of reports and estimates that a saving of £2,000 per annum would result. The Corporation, directly it put theory into practice, was sorely disillusioned, as it was found that the collection of refuse by motor waggons cost 2s. 4.5d. per ton as against 1s. 8.8d. per ton by horse traction, an increase of over 35 per cent. This result, however, does not indicate the absolute superiority of horse traction over motor vehicles for municipal work, but rather the application of the latter in services for which they were most unfitted. In the collection of refuse frequent stoppages are necessary, and short haulages for mechanically propelled vehicles are always costly. The *Commercial Motor* recently published a lengthy article on "Motors for County, Municipal, and Urban Authorities," and incorporated reports from many municipal engineers who have had experience of them, and the general opinion appeared to be that for street watering and sweeping purposes and for hauling materials the motors were extremely useful and economical. Now that the reliability of these vehicles has been improved, their more widespread and judicious adoption would probably effect a considerable saving in the municipal expenditure.

We lately noticed in these columns an admirable address on Smoke Prevention by Mr. Arthur J. Martin, in which he put forward a suggestion that gas should be utilised for heating, cooking, and power in lieu of coal as an effectual remedy for abating the ills caused directly and indirectly by smoke and fogs. Two scientists of Gloucester, Mass., have offered, for the sum of £1,000,000, to purify the atmosphere of New York in a far more startling way, which, however, may not bear the severe test of being put into practice. These gentlemen, Dr. Hans Liebrich and Mr. L. D. Lothrop, state that the vapour overhanging the city is nothing more nor less than 150,000,000 cubic yards of disease germs, covering an area of 100 square miles and of an average height of 500 yards. The proposal they put forward to the Board of Aldermen is to erect mammoth suction pipes, which by pneumatic means will draw down the foul air, smoke, dust, fumeations, carbonic acid gases, and all other "odours" into the nearest sewer hole. The circulation thus set up will induce a continual supply of fresh air to the city, decrease the mortality, and turn New York into a veritable paradise. The space at our disposal is insufficient to deal with the demerits of the scheme, but it has one fascination, that it is distinctly original.

We understand it is proposed to promote a company, having a capital of £300,000, with the object of supplying electrical current to the mills and factories along the river Hooghly. A generating station will be erected and mains laid along both banks of the river to a distance of seventeen miles south to Budge Budge, and a distance of twenty-five miles north to the town of Hooghly. The factories within that area use approximately 120,000 h.p., and it would appear that such a power scheme has a large scope for success.

The official inauguration of the Simplon Tunnel by the King of Italy took place last Saturday week, the King travelling to Brieg, in Switzerland, where the ceremony took place. His Majesty subsequently returned to Piedmont, and was followed by the Swiss President and members of the Federal Council. In the speeches that followed the dinner there held, the King expressed his admiration of the skill and energy of the engineers who had achieved this wonderful feat, and put into execution this imperishable work.

That the Norwegians recognise to the full the capital with which Nature has endowed their country in her waterfalls was recently proved by the hasty provisional measure passed by the Norwegian Parliament in regard to the control of the falls. The wealth of the country lies in its mineral and forest resources and its waterpower, and a possibility arose that a considerable number of the falls would be transferred into the hands of foreign capitalists. The new law provides that falls of considerable capacity can only pass into the possession of companies in which Norwegians hold one half the share capital, and whose directors are natives of, and domiciled in, the country. The chief reason behind the promulgation is that the railways are State owned, and as there is a scheme on hand for introducing electric traction, the energy being produced by waterpower, it was feared that foreign ownership would lead to future serious difficulties when the suggestions took shape. A far-sighted policy, indeed, from every aspect.

That art is not entirely distinct from engineering is evidenced in the recommendations of the London County Council Improvements Committee, with respect to the sanction of a capital expenditure, not exceeding £15,400, for the erection of propylæa with groups of statuary at the new Vauxhall Bridge, and the preparation of an agreement with Mr. Alfred Drury, A.R.A., for the modelling and casting, at a total cost of £2,800, of four groups of statuary to be placed on the propylæa. These ambitious proposals were referred back to the Committee, but it is to be hoped that even this seemingly extravagant expenditure will be faced, if the result will add a few striking examples of modern sculpture to the gaunt and uninteresting thoroughfares of the English metropolis. The new bridge, over which there was so much discussion as to the merits of the design, affords an opportunity for bold treatment with groups of statuary, which might help to raise it to the level of some of the finer Continental bridges, which do not entirely rely for their beauty on nuts, bolts, and steel construction, so often considered "good enough" by the average English citizen.

After years of consideration and the loss of abortive Bills, the Cork Railway scheme appears to be on the eve of fruition. The Link Bill, under which it was proposed to join the Great Southern and Western Railways to the lines on the south of the River Lee by means of a high level bridge, has recently been before a Select Committee of the House of Commons, but was rejected. The alternative low level scheme has, however, been more successful, and on Monday last the preamble was passed. Both schemes were well backed, but the latter appears to have the chief merits and fewer disadvantages, as it is simpler, cheaper, and less objectionable. Some extraordinary changes on the part of public bodies have been witnessed in regard to their attitude towards the project. Last year the Cork County Council favoured the high level scheme, and offered a contribution of £50,000 in its support, which would have had to be met by the levy of a rate. This year the offer was withdrawn, and the ratepayers may therefore look on the scheme with minds unprejudiced by the effects it may have on their pockets. Again, last year the Cork Harbour Commissioners so bitterly opposed the Bills that their efforts led mainly to



the defeat of the measures. This year, recognising that some connection will eventually, by stress of events, be made, the Commissioners wisely threw the weight of their influence into the scale on behalf of the cheaper scheme, which is less likely to injure the interests of the port, with a consequent considerable diminution in the revenue of the Harbour Board. Not content with this *volté face*, a cash contribution of £10,000 has been offered towards the work. The Treasury will contribute £25,000, and the Cork and Bandon Railway, which will probably benefit more directly by the carrying out of the proposals, will sink £15,000 in the undertaking. The Great Western Railway Company, on receiving these guarantees, will finance the scheme, and may be expected to eventually reap a rich harvest; indeed, it is highly probable that before many years have passed the whole of the lines in County Cork will be in the hands of the English company. From a national point of view, such a transfer might be deplored, but the development of West Cork would be materially assisted. Corkonians do not rejoice that there is now a probability of the work being shortly put in hand, as the break in railway transit is a financial benefit to the city, but the farmers of the more backward parts of the county will rejoice, when their goods can be more rapidly and cheaply forwarded to the English markets. The unfortunate part of the whole matter, except for the legal profession, is that the law costs for the last few years will reach a sum nearly equal to that necessary to carry through the engineering scheme.

## IMPORTS.

### PORT OF DUBLIN.

May 16th, per City of Dortmund, from Hamburg, 200 tons asphalt, John Reinhardt and Son, Ltd.

May 17th, per Winga, from Göteborg, 20 cases glass, 11 cases turned wood, 227 bundles mouldings, 5,172 pieces, 526 bundles boards, 3,100 bundles laths, 3,061 pieces battens, 14,792 pieces boards and battens, 1,183 pieces deals and battens, to order; per Wild Wave, from Glasgow, 110 tons bricks, etc., T. Archer.

May 19th, per Lady Wolseley, from London, 60 packages lead, T. Dockrell, Son, and Co., Ltd.; 440 sacks cement, to order.

May 21st, per Harrier, from Bangor, 120 tons slates, Brooks, Thomas, and Co., Ltd.; per Alastair, from London, 395 tons cement, W. L. Crowe, Ltd.; per Kangaroo, from Bridgewater, 140 tons bricks, T. Archer.

May 22nd, per Val de Travers, from Treport, 400 bags plaster of Paris, to order; per Penrhyn, from Middlesboro', 330 tons cement, J. P. Corry; per City of Belfast, 200 tons asphalt, John Reinhardt and Sons, Ltd.

May 23rd, per City of Brussels, from Antwerp and Ghent, 40 cases window glass, W. Collins; 80 do., do., H. Sibthorpe and Son; 5 do., do., F. Byrne; 3 do., do., J. Cunningham; 141 do., do., Brooks, Thomas, and Co., Ltd.; 50 do., do., Hoyte and Son; 20 do., do., W. Martin and Son; 13 do., do., P. Ceppi; 136 do., do., T. Dockrell, Sons, and Co., Ltd.; 352 do., do., to order; 706 steel joists, to order; 6 cases plate glass, to order; 13 cases marble, to order; 5 cases limestone, to order; 5,006 bags cement, to order; per Elsinore, from Fredrickstad and Christiania, 34,327 pieces planed boards, 10,491 pieces scantlings, J. Kelly and Son; 7,891 pieces planed board, J. M'Ferran and Co.; per Truthseeker, from Rochester, 175 tons cement, A. Agnew; per Miss Evans, from Irvine, 140 tons fireclay goods, Brooks, Thomas, and Co., Ltd.

May 27th, per Hercules, from Danzig, 3,065 pieces timber, T. and C. Martin, Ltd.

May 28th, per Carrigan Head, from Montreal and Quebec, 12,899 deals, 47,287 pieces firwood sawn, 39 pieces oak, 17 pieces ash, 26 pieces firwood, 77 pieces firwood hewn, to order.

May 29th, per City of Oporto, 100 tons asphalt, John Reinhardt and Son, Ltd.

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## REVIEWS.

"Joiners' Machines and How to Work Them," by T. I. Groom. We have been favoured with a copy of this book which is published by Messrs. Wm. Rider and Son, Ltd. 164 Aldersgate-street, London, E.C., at one shilling net. The author has had several years' practical experience as a sawyer and machinist, and later as representative of a firm of saw mill engineers; has visited mills in different parts of the country, where he has studied the methods of different men in working saw mill machinery. Mr. Groom has certainly turned his experience to good account, and has produced a practical and lucidly worded treatise written in simple language from the worker's point of view. It is primarily intended for builders, joiners, and cabinet makers using their own machinery, and for young mechanics learning their trade, and contains much information and many hints that cannot fail to be of great help to all of these. The working of saw milling machinery is a highly skilled trade, though often not regarded as such, and a really good machinist is a most desirable workman who need never want employment. This book will help woodworking machinists to know their trade more thoroughly, which, as the author says, should be the aim of every workman.

## Practical Mathematics.

The Rudiments of Practical Mathematics, By A. Consterding, M. A., and A. Barnes, M. A. London: John Murray, Albemarle Street.

Through an oversight, this most admirable little treatise was not reviewed at the time we received it, and so this review copy has remained unattended to almost ever since but "better late than never," for the delay has given us the opportunity of perusing it with more deliberation and consequent appreciation than is usually possible in the case of the ordinary book review; and we may frankly say that we have derived both profit and pleasure therefrom. Practical mathematics are the foundation of almost all science without a respectable acquaintance therewith success in commerce is impossible, while to the engineering and architectural student such an acquaintance may be described as the concrete foundation upon which superstructures of the most diversified character are built. Yet it is almost incredible the extraordinary "ignorance" of this subject, we were about to say, but it is not exactly ignorance, it is rather want of grasp of principles, that prevails amongst those proceeding to the technical study of complicated and involved professional courses. This is true, even of those who have distinguished themselves as boys at school, and the reason is plain: the ordinary manuals of elementary mathematics are far too wanting in practical character, and the teachers, as a rule, seem to lack the power of conveying the true "bed-rock" principles and application of mathematics to ordinary every-day matters, with the result that a certain mystery surrounds the subject. The authors have realised this. In addition to those for whom it has been specially devised, this little work should be found of great utility by engineering and architectural students, and even by older men who have grown "rusty" in the application of practical mathematics to every-day problems.

The method adopted differs entirely from the old-time way of the school text-books—it is eminently practical, and teaches the student to think for himself, and to regard the methods described, not as so many blind formulae, but as the logical working out of a problem. The authors tell us that they have endeavoured to "amalgamate the various branches of mathematics, and to break down the water-tight compartments into which each of the branches is frequently divided. The various rules have not, therefore, been introduced and then abandoned; they have been introduced to be put into constant use."

Rules possessing only an academic interest have been "purposely excluded." Therefore, as soon as the pupil has got the true meaning of "measurement," or length, breadth, and depth, into his head, he is at once brought on to decimals. The system avails itself largely of graphic methods and the use of symbols. As soon as these preliminary facts have been mastered, the student is at once plunged into "simple equations, one of the most serviceable forms to which it is possible to reduce mathematics. Indices and logarithms, and the elements of trigonometry, naturally follow. In a word, the authors seem to have realised the hopelessly complex form in which the elements of these various branches are usually presented to the schoolboy, the inevitable result being that he learns the rules by rote, and is too often quite incapable of applying them to any practical problem. We strongly recommend the work, which, of course it is right to remark, presupposes an acquaintance with the elementary rules of arithmetic.

## BY-LAWS.

By MR. J. A. CROWTHER, A.M.I.C.E., *President of the Institute of Sanitary Engineers.*

## PART II.

SALT V. SCOTT-HALL, May 24th, 1903.

## AN IMPORTANT CASE.

A Rural Sanitary Authority made a by-law under which every new building had to be enclosed with walls of brick, stone, or other hard and incombustible material properly bonded and solidly put together. The respondent had erected a bungalow chiefly of wood. It was an isolated building, and intended for a summer residence.

Held, that the by-law was not invalid on the ground of unreasonableness because it did not contain a power under which the Sanitary Authority might exempt such buildings if they thought fit; but that the justices had a discretion to dismiss the summons under Sec. 16 of the Summary Jurisdiction Act, 1879.

Case stated by the justices in and for the county of Anglesey.

On October 8th, 1902, an information was laid by John Salt, Inspector of Nuisances and Surveyor of New Buildings for the Valley Rural District Council, being the Sanitary Authority for the parish of Llanfaelog (hereinafter called the appellants), against William Edmund Scott-Hall, of Plas Maelog, in the parish of Llanfaelog, in the county of Anglesea, and Margaret More Scott-Hall, the wife of the above-named William Edmund Scott-Hall (hereinafter called the respondents), jointly for that they, on October 1st, 1902, at the parish of Llanfaelog, in the county of Anglesey aforesaid, "unlawfully did break a certain by-law made by the guardians of the Holyhead Union, acting as the Rural Sanitary Authority in pursuance of and in accordance with Sec. 23 (3) of the Public Health Amendment Act, 1890, and duly confirmed with respect to new streets and buildings, in that they did unlawfully erect or cause to be erected a new building or bungalow without causing such building to be enclosed with walls of good bricks, stone, or other hard and incombustible materials properly bonded and solidly put together near Plas Maelog, in the parish of Llanfaelog, in the rural district of Valley, in the said county of Anglesey, contrary to the said by-law and to the form of the statute in such case made and provided."

The full text of the said by-law is as follows:—

"Every person who shall erect a new building shall cause such building to be enclosed with walls, constructed of good bricks, stone, or other hard and incombustible materials, properly bonded and solidly put together (a) with good mortar, compounded of good lime and clean, sharp sand or other suitable material, or (b) with good cement, or (c) with good cement mixed with good sharp sand."

By-law 98 enacts: "That every person that shall offend against the foregoing by-laws shall be liable for every such offence to a penalty of five pounds, and in the case of a continuing offence to a further penalty of ten shillings for each day after written notice of the offence from the Sanitary Authority."

On the hearing before us on November 10th, 1902, the following facts were either proved or admitted by both parties:—

That the structure in question was erected by and was the property of the respondent, William Edmund Scott-Hall, and was intended to be used in the summer months as a dwelling-house or bungalow.

That the foundation was of stone, the chimney, and breastings of brick, and the rest of the building of wood, except the roof, which was of slate.

That all the rooms of the bungalow were on the ground floor, and that the windows were French windows.

That the parish of Llanfaelog, where the said building is situated, is a rural parish adjoining the sea.

That the bungalow is an isolated building in the country, the two nearest houses thereto being respectively 450 and 200 yards distant therefrom.

That bungalows of a similar character are frequently built, and that there are five bungalows erected in the appellants' district.

That the cost of building a bungalow would be less than the cost of building a stone or brick house of similar accommodation.

That a bungalow made of wood, similar to the one erected by the respondent, is as healthy as it would have been if erected of bricks or stone or other hard and incombustible materials.

That the by-laws adopted by the appellants were in the form of a set of model by-laws prepared by the Local Government Board for Urban Districts.

That since the adoption of such by-laws the Local Government Board has prepared a set of model by-laws for Rural Districts.

They have not been adopted by the appellants.

That the above by-law had been properly made, and confirmed by the Local Government Board in accordance with the Public Health Acts.

The appellants' case was that on the facts above set forth an offence against the said by-law had been proved, and that the defendant, William Edmund Scott-Hall, should have been convicted.

The case against Mrs. Scott-Hall was withdrawn.

The respondent contended:—(1) That the by-law was unreasonable in a thinly populated parish like Llanfaelog, or in a thinly populated district like that of the appellants, inasmuch as it absolutely prohibits the erection of wooden bungalows under any circumstances whatever, and however isolated, and does not reserve any discretion to the appellants to permit the erection of such bungalows under any circumstances.

(2) That the by-law was *ultra vires*, inasmuch as Sec. 23 (3) of the Public Health Amendment Act, 1890, under which the said by-law was made, only enables Rural District Councils to make by-laws for the purpose of health and not for the purpose of stability and prevention of fire.

That the said by-law is made for the purpose of securing stability and prevention of fire and not for the purpose of health.

We retired to consider our decision, and on returning into Court the chairman announced that we could not agree.

The chairman wrote on the charge sheet, "Dismissed, no order made."

The question for the determination of this honourable Court is whether, on the above facts, we, the said justices, were right in dismissing the said information against the said respondents for the reason that the said by-law was unreasonable and *ultra vires*, or whether we were bound to convict the respondent of the offence with which he was charged.

J. Richards.

E. Parry Edwards.

W. H. Edwards.

T. G. Kendall.

A. C. Davenport (with him Ellis Griffiths) for the appellants: The by-law is not unreasonable, and the justices were not entitled to dismiss the summons on that ground. The by-law in question is one of a set of by-laws prepared by the Local Government Board for use in urban districts, and the obvious reason of the by-law is to guard against risk by fire. It had already been the subject of judicial decision, and was pronounced to be reasonable in *Badley v. Cuckfield Union* (1895), 59 J.P. 582. That was also a case of applying this by-law in the district of a Rural Sanitary Authority. In *Wanstead Local Board v. Wooster* (1895), 38 J.P. 21, it was held that a by-law preventing any occupier of a house from keeping pigs within 100ft. of a dwelling-house was reasonable on the ground that the doing so was likely to cause a nuisance which might be prohibited altogether. It is true that in *Heap v. Burnley* (1884), 12 Q.B.D. 617, 48 J.P. 359, a similar by-law, but limiting the distance to 50ft., was held to be bad, as unreasonable, because it was then to be applied to rural districts. In this case, however, the danger is as great in rural as in urban districts, and the by-law applies equally, as is shown by *Badley v. Cuckfield Union*, *ante*. The principle on which the Court will pronounce by-laws as invalid on the ground of unreasonableness was discussed in *Stickland v. Hayes* (1896), 1 Q.B. 90; 60 J.P. 164; *Johnson v. Mayor of Croydon*, 16 Q.B.D. 709; 50 J.P. 487; and *Kruse v. Johnson* (1898), 2 Q.B. 91; 62 J.P. 469.

## WHAT APPLIES TO RURAL DISTRICTS.

Bryn Roberts, for the respondents: A by-law such as this was never meant to apply to rural districts, and certainly not to an isolated building, such as the present one, used exclusively at a summer residence. It might be necessary in a village where there is danger of the fire spreading to other premises, but it is unreasonable as it gives no discretion to the Sanitary Authority in the matter, and, according to the argument of the appellant, it must be enforced, whatever may be the circumstances of the case.

Lord Alverston, C.J.: No doubt it would be more satisfactory, with regard to by-laws, if there were powers taken in by-laws to direct the Local Authority to exercise their discretion under exceptional circumstances. We are asked to say that this by-law is unreasonable, and therefore wholly void, because there is no such provision in the by-laws. I think we could not go as far as that. In the first place, these by-laws are in identically the same terms as by-laws which have been held to be reasonable—or rather, have been treated as reasonable—in *Badley v. Cuckfield Rural District Council* (1895), 59 J.P. 582. It was stated that these are the model by-laws which have been adopted in urban districts with the sanction of the Local Government Board. Of course, there must be many places in which such a by-law would be a most salutary and prudent one. Therefore, when I say that it would be more satisfactory if



these by-laws contained a dispensing power, I do not mean to say that under many circumstances such a by-law might not be most useful and salutary, and most reasonable; but, even as it stands, I should hesitate a great deal before holding that this by-law is unreasonable. It seems to me that the consequences of such a decision might be very serious, not only as practically overruling the Cuckfield case, decided by the late Lord Chief Justice and Charles, J., but as having a very far-reaching application with regard to a great many other by-laws in this country, some of which, I hope, do have powers enabling the Local Authorities to deal with the matter according to their discretion. We are asked by the magistrates whether they were right in dismissing the summons against the respondents for the reason that the by-law was unreasonable and *ultra vires*.

I think the magistrates were wrong in dismissing the summons on the ground that the by-law was *ultra vires* and unreasonable.

#### MAGISTRATES WERE WRONG.

Now, it is conceded, and, I think, rightly conceded, by Mr. Roberts—though, no doubt, raising a point which was obviously not the real point in the case, that this Rural Authority had urban powers; therefore the question of the by-law not being made in accordance with the powers given under Sec. 23 of the Act of 1890 disappears. Of course, we have already indicated in the course of the argument that we do not think there was the power to make these by-laws under that section. Taking Sec. 157 and the other sections of the Public Health Acts together, we think the by-laws are not *ultra vires*, nor can we say that they are unreasonable. The only other matter I have to deal with is what is involved in the subsequent words of the question asked by us by the magistrates: "Whether we were bound to convict the respondent of the offence with which he is charged?"

It is true that these by-laws apparently contain no exempting clause or exempting power, but the proceedings to enforce them are taken under the Summary Jurisdiction Acts by virtue of Sec. 231 of the Public Health Act, 1875. I mention that because it was brought to our attention not very long ago that the magistrates have powers to dismiss the summons under Sec. 16 of the Summary Jurisdiction Act, 1879, if they think that, though the charge is proved, the offence was in the particular case of so trifling a nature that it is inexpedient to inflict any punishment or any other than a nominal punishment. I think this case must go back to the magistrates with a direction that the by-

laws are not *ultra vires*, and that they are to deal with the case, having regard to their powers under Sec. 16 of the Summary Jurisdiction Act, 1879. They certainly should exercise their discretion, and deal with the matter as they think fit on the merits of the case.

Willis, J.: I agree.

Channell, J.: I agree. I should just like to add a few words, not in any way differing, but to explain the view I take of the matter. It seems to me that all by-laws relating to the construction of buildings ought to have something in the nature of a dispensing power in them, enabling the Local Authority, or Surveyor, or somebody or other, to say that a particular building is of an exceptional character, and that hard-and-fast rules laid down by the by-laws as to the mode of construction ought not to apply to that particular building. But if we were to hold that every set of by-laws that did not contain something or other of that sort were bad by-laws, it would follow that as regards any other building, proceedings would be taken against it under that set of by-laws, although the particular building was not, as this one is, one of the exceptional ones. We would have to hold that these by-laws could not be enforced according to the principle on which by-laws are now dealt with, namely, that the Court does not interfere to set aside by-laws which a Local Authority has deliberately adopted, because it is held that they ought to be the best judges of whether a particular by-law is required in their own district or not. Having regard to that, it seems to me that it would be mischievous if we were to hold that every set of by-laws, although they purported to lay down a hard-and-fast rule for all buildings, were necessarily bad because they did not give the dispensing power. I think that would be mischievous. I think the proper way to treat them is this: to say that such by-laws must not be set aside entirely as unreasonable, because the magistrates must be trusted to exercise the power they in fact possess, of dealing with exceptional cases, when they arise, under Sec. 16 of the Summary Jurisdiction Act, 1879, either by inflicting a merely nominal penalty, or, if they think fit, by saying that the particular offence is of too trifling a character to require any punishment or any penalty at all. It is because the magistrates have these powers that it is unnecessary to say these by-laws, which, unfortunately, omit to provide specially on their face for exceptional circumstances, must necessarily be set aside because exceptional cases may arise. I think that this is the best way of dealing with such an objection to the by-law.

Appeal allowed.

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## ENGINEERING NEWS.

**Athy.**—The Athy Urban Council are about to commence the construction of waterworks, in connection with which pipes would be laid at certain points along the public road in Queen's County, from intake wells in the townlands of Wolfhill and Ballyleahane Lower.

**Celbridge.**—**RURAL DISTRICT OF CELBRIDGE No. 2.**—The Rural District Council of Celbridge No. 2 will, at their meeting to be held in the boardroom of Celbridge Workhouse, on Friday, 15th June, proximo, consider tenders for the construction of septic tanks, and other sewage disposal works, at St. Edmundsbury demesne, Lucan, in accordance with plans and specification prepared by J. J. Inglis, Esq., C.E., 18 Nassau-street, Dublin.

**Dublin.**—**THE NEW VARTRY RESERVOIR.**—At a recent meeting of the Dublin Corporation it was moved:—"That the Waterworks Committee be, and they are hereby empowered to employ a waterworks engineering expert to report on the plans and specifications, etc., for the proposed new Vартry reservoir at Roundwood at a fee not exceeding £200." A lengthened discussion followed, the chief point of which was that, as Mr. Spencer Hart, the City Engineer, was their expert, he should not be relieved of his responsibility in connection with this matter. The resolution was adopted by a majority of 47 votes to 15.

**Kildare.**—**The Naas No. 1 Rural District Council** will, on 5th June, consider tenders for extending the Kildare Waterworks to Coneyham Lodge, Kildare.

**Malahide.**—**THE WATER SCHEME.**—At the last meeting of the Malahide Rural District Council, Mr. Early, solicitor, wrote stating that he had accompanied Mr. Boyd over the lands to be affected by the scheme. He had obtained all the names of the occupiers and owners, and he had forwarded them to Mr. Boyd to have the area of the lands invested therein, and valuation of the lands by a competent valuer would be required if it were found to be impossible to arrange by agreement with the parties. After some consideration the names of four or five competent valuers were submitted to Mr. Early to make a selection therefrom.

**Sligo.**—**The County Council of the County of Sligo** invite applications for the position of County Surveyor. Candidates must send in their applications in writing to "The Secretary, County Council, Courthouse, Sligo," not later than Tuesday, the 5th day of June, 1906.

**Tullamore.**—**ENGINEER WANTED.**—The Rural District Council will, on 12th June, proceed to consider applications from duly qualified persons for the preparation of plans, specifications, and estimates, and the superintending and certifying of all repairs and works in respect of labourers' cottages, public pumps, burial grounds, and sewers in the district.

**Tullamore.**—**TULLAMORE UNION.**—The Guardians will on the 5th June consider tenders for the repairs of all machinery in the workhouse in respect of steam boiler, sewerage apparatus, kitchen, laundry, etc., also all plumbing repairs required in the workhouse.

**Tramore.**—In our advertising columns to-day the Public Health Committee invite tenders for supplying and erecting an oil engine and pumps and suction gas plant and pumps at the filter beds, Tramore. Particulars can be had on application to Mr. J. Fleming, C.E., 44 Lady-lane, Waterford.

**Warrenpoint.**—Tenders were received for the construction of baths for the Warrenpoint Urban District Council. Messrs. Kaye, Parry and Ross, civil engineers and architects, 63 Dawson-street, Dublin.

**Wexford.**—The Corporation of Wexford invite tenders for the supply of the undermentioned sewer pipes to be delivered either at the North Wexford Railway Station or on the Quay, convenient to Common Quay-street:—140 circular sewer pipes, 3 feet long, 18 inches internal diameter; 22 pipes as above, with 6 inch splayed junctions; 320 do., 3 feet long, by 15 inches diameter; 100 do., with 6 inch splayed junctions; 320 pipes, 3 feet by 6 inches internal diameter; 100 reducers from 6 inches to 4 inches; two 18 inch half channel pipes, 3 feet radius; two 16 inch half channel pipes, 3 feet 6 inches radius; one 16 inch half channel pipe, 2 feet 6 inches radius. All the foregoing to be of best quality, extra salt glazed, free from flaws and other defects. Sockets to be 3 inch deep, with 3 inch space all round for gaskin and cement. All must be guaranteed to stand the water test. 18 inch pipes to be 1½ inch thick, and 15 inch to be 1¼ inch thick. Tenders to be sent to Wm. A. Browne, Town Clerk, before 7th June.

Messrs. Meldrum Bros., Ltd., of Timperley, near Manchester, have just secured an order for the equipment of three destructor stations, each having a normal capacity of 100 tons per day of 24 hours. Each station will be fitted with three of their well-known regenerative furnaces with large boilers of the Babcock and Wilcox type. The aggregate normal capacity of these plants is over 500 tons per diem, and together form one of the largest destructor contracts ever placed. They are to be erected on different sites in the City of Paris.

## CONTRACTS.

TRAMORE PUBLIC HEALTH COMMITTEE.  
WATERWORKS.

## TO ENGINEERING CONTRACTORS.

The above Committee invite Tenders for supplying and erecting an Oil Engine and Pumps and Suction Gas Plant and Pumps at the Filter Beds, Tramore. Particulars can be had on application to Mr. J. Fleming, C.E., 44, Lady-lane, Waterford.

Tenders to be lodged with the undersigned, and endorsed, on or before June 14th, inst.

EDMUND DOYLE, Secretary.

Tramore, May 26, '06.

## AUCTIONS.

WAR DEPARTMENT BRICKWORKS, NEWBRIDGE,  
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Robert J. Goff and Co. have been favoured with instructions from the Commanding Royal Engineer, Curragh, to sell by Auction, at the Great Connell War Department Brickworks, Newbridge, Co. Dublin, on Wednesday, 6th June, 1906,

The whole of the Brickmaking and General Plant, including two Murray's No. 2 Patent Brickmaking Machines with cutting off Tables, Winding Hoist, set of Kibblers, two 14 h.p. Horizontal Engines ((by Robey and Co.), a Cornish Boiler (24 ft. by 6 ft. 6 in., by Turner, of Ipswich), one Double-Acting Feed Pump, Berryman's Feed Water Heater, one Water Softening Plant (by Tyache and Co.), one Mortar Mill 6 ft. Pan, a Traction Engine (by Fowler and Co., Leeds), a 20 h.p. Portable Engine (by Robey and Co.), twelve 6 Ton Haulage Wagons (by Fowler and Co.), and six ditto (by Clayton and Shuttleworth), one 4 Ton Weighbridge (by Pooley and Son), a Quantity of light Portable Railway, 2 feet gauge; Turntables, Steel Tipping Trucks, Hand Presses and Moulds, Wheeling Plates, Crowding, Off-bearing and Navy Barrows, and General Plant, Kilns, Buildings, Engine and Boiler Houses, Etc.

Terms—Strictly Cash. Purchasers to pay 5 per cent. Commission.

Sale to commence at 11.30 o'clock sharp.

Catalogues to be had from Robert J. Goff and Co., Auctioneers, Henry-street, Newbridge, Co. Kildare.

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No. 12—Vol. XLVIII.

HEAD OFFICE:

JUNE 16, 1906.

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## TOPICAL TOUCHES.

The late Miss Eliza Barber, who died in March last at Brighton, has left £6,000 for building a new Convalescent Home for the poor of Dublin, £5,000 to the Meath Hospital for building a new wing to be called after her, also £2,000 each to Mercer's and the City of Dublin Hospital, as well as many minor charitable bequests.

At a meeting of the Pembroke Urban Council held on Monday last, a letter was received from the Clerk as to the sum of £6,500, sanctioned by the Council to be borrowed for additional generating plant and accumulators at the electricity and refuse destructor works, in which he stated that he presumed the Council intended to continue Messrs. Hammond and Sons as consultants. It was also stated that the Finance Committee recommended that the Council should terminate the existing arrangement, and if or when necessary again employ expert advice.

The Chairman remarked that they were now going to spend £6,500, and that meant that they might come to the conclusion that they could spend it properly enough and economically enough without any advice. If they were to have advice at all, then they should pay 4 per cent. to Messrs. Hammond.

In the course of the further discussion which followed Dr. Flood and Mr. William Beckett both declared that a local electrical engineer should be employed, Dr. Flood remarking that it was perfectly monstrous to bring over engineers from the other side when there were plenty of thoroughly competent men here on the spot, and, therefore, in a better position to see the work as it went on.

We greatly regret that Dr. Flood's and Mr. Beckett's advice was not taken, and we noted with surprise that it was on the motion of Mr. Goodfellow, who is himself, we believe, a contractor, that the suggestion was negatived.

There is altogether too great a tendency to rush to England for architects, civil engineers, electrical engineers, and so on, a tendency so great as to simply indicate a propensity to "snobbishness." We do not find the English coming over in search of professional assistance, nor do we find the more practical people of Belfast ignoring their local talent. It is impossible to take up a single issue of our contemporary, the *Architect and Contract Reporter*, without finding advertisements of various kinds of competitions, entry upon which is strictly limited to men engaged in particular counties. For instance, this week there is an announcement of an architectural competition for schools in Lancashire. Only architects practising in that county are eligible.

Without advocating "exclusive dealing," we think just a little of the same spirit infused into our City Fathers, would not come amiss.

Engineers and architects, the local authorities seem to forget, are ratepayers, and have to contribute their quota towards the cost of all these enterprises, and it is unfair that they should not come in for, at least, a share of the honours and the patronage distributed. If engineers were exempted from payment of rates, one could better understand the present boycott by the Dublin Corporation and the various suburban bodies, of Irish professional men, a boycott pretty rigidly maintained during the past few years.

The summer season being upon us, excursions are the order of the day. The Royal Society of the Antiquaries of Ireland have arranged for a meeting to be held in Killarney with excursions, beginning on Monday, 18th inst., and lasting the week. A really fine programme has been arranged, and will include visits to the Gap of Duirloe, the Lakes, Ross Castle, Killarney Cathedral, Killarney House, Muckross and Innisfallen Abbeys, Ardara Abbey, Aghadoe Cathedral, Killagh Abbey, and many other places of the utmost antiquarian interest.

The Architectural Association of Ireland are arranging a most instructive three or four days' trip to Northamptonshire, with Kettering for headquarters. Kettering, Northampton town, and the Churches of the Nene Valley are simply brimful of architectural interest, and afford Irish architects a unique opportunity of seeing this beautiful old Northamptonshire work quickly, cheaply and conveniently, and we look forward to a big attendance. Mr. J. A. Gotch, of Kettering, who is simply an encyclopædia of knowledge relating to English architecture, is kindly advising the Association Excursion Committee.

Yet another technical journal has appeared—*Civil Engineering*—which claims to be "the only civil engineering journal published." A copy of the first number has reached us, and we presume that what our contemporary means by this rather "tall order" is that it is the only journal exclusively devoted to civil engineering. It is true some of the older journals have largely drifted into the domain of mechanical engineering, while others deal with municipal or architectural matters. Still we think a less sweeping statement might have answered the object in view equally well.

*Civil Engineering* is exceedingly nicely produced on good paper in attractive type. The first number contains several interesting articles, notably, one on the Zambesi cableway, also some paragraphs entitled "Enterprise in Ireland," and "Sanitation in the Cities," by Mr. M. F. Purcell, of Dublin.

San Francisco architects complain that architects, engineers and draftsmen from all over the country and abroad are flocking to California, where there are already plenty of them well qualified to undertake all the work likely to be available. An American contemporary warns all and sundry against going out without positive assurance of employment. Our contemporary adds, that those who rush out, "burning their ships behind them," may, for a short time, obtain employment, but as matters right themselves and resume normal proportions, which will be sooner than we imagine, employment will become scarce, and those who have "cut their bridges" or "burnt their ships," will only add to the already too large surplus population.

There is no doubt but that the buildings to be erected in new San Francisco will be almost entirely of reinforced concrete. On the Pacific Coast timber is comparatively very cheap, while steel and cement are expensive. Many Americans have advocated the suspension of the restrictions now existing upon the importation of steel and cement from Great Britain and Germany, so as to reduce the cost of building materials—a suggestion which seems an eminently practical one.



We offer our sincere condolences, in which we are sure all our readers will join, to the popular city architect of Dublin, Mr. Charles J. MacCarthy, in the great bereavement he has just sustained through the death of Mrs. MacCarthy, a popular and talented lady, who was herself an artist of ability and a contributor to some of the Dublin exhibitions of paintings.

In another column we publish a list of tenders for labourers' cottages about to be built at Cookstown, Co. Tyrone. The list affords a remarkable illustration of the great increase in the cost of building such cottages in rural districts in Ireland, though even taking into account the comparative cheapness of building in the North, as compared with that of Dublin and the South or West of Ireland, it cannot be held that the estimates are prohibitive. The accepted tenders for single cottages varied from £183 to £141, and for pairs from £346 to £297. It is far better for the promoting authorities to pay a good price and get roomy, decent, well-built houses, than cottages which are inadequate in size for the decent housing of a family, and are bound to be "jerry" built, if competition is too keenly forced.

### CORRESPONDENCE.

#### New Irish Labourers' Act.

DEAR SIR,—In reference to your observations on the difficulties an architect has to contend with in carrying out a large scheme under the Acts and the class of contractor he sometimes has to deal with, enclosed is a copy of a letter which I have been compelled to address to several of my contractors under one of these schemes, and which will give your readers an idea of what I have to go through. What class of work will be perpetrated when the architect's control is removed will be better imagined than described.—Yours, etc.,

"AN ARCHITECT."

(Copy.)

DEAR SIR,—I understand from the Clerk of ——— Rural District Council that we have again to do work together—you as contractor for some labourers' cottages, and I in the capacity of architect for these works.

It occurs to me that a timely word of warning may be of much service and save you both trouble and expense hereafter.

As you are aware, I had building transactions with you before, and to put it straightforwardly, and, as I am sure you are aware, these have been most unsatisfactory and very unpleasant. You are now about to start work, if you have not already done so, and I wish to intimate for your information that if you do not give *good honest workmanship and materials from the very commencement*, so as to satisfy me and the Clerk of Works, I shall not certify for the value of one penny piece from the time that such a state of affairs is discovered until it is altered and made thoroughly honest work.

*Please let this warning sink deep into your mind.*—Yours truly,

#### The Laws of Party Walls—Letter from Mr. Arthur Hill, M.A., B.E.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR MR. EDITOR—When will the legal mind rid itself of the absurd idea of two parties owning each "his own half" of a wall.

If two parties have a right of way over an avenue, would any one in their senses suggest that each man was only permitted to drive half a carriage on his own side of the road?

If two parties joined in the building of a ship, should the earning power of the hold be divided by an imaginary line from bow to stern?

In the party wall case, reported in the last number of the IRISH BUILDER, the Master of the Rolls very properly repudiated the idea that a girder or beam may not penetrate a wall for more than half its thickness.

A wall is a complete thing in itself. Surely the conception that it can be slit up in some way for each man's separate enjoyment, is a legal fiction founded on an impossibility.

Some fictions live long. Let us hope the extreme limits of old age have been reached in this case, and that the idea of joint ownership may take its place.—Yours etc.,

ARTHUR HILL.

Cork, June 12th, 1906.

#### WARING'S NEW PREMISES.

Waring's new building in Oxford-street will be opened on Monday next, and judging from the programme that is arranged, it promises to be a social and commercial event of the first importance. It is certainly an exceedingly novel project for a house of business to throw open its doors to invited visitors for the period of a whole week and to carry out at the same time the self-denying policy of effecting no sales. Next week's event is, in fact, a great demonstration, extending over six days, of the policy, aims, resources and capabilities of this most enterprising firm. In this unique ceremonial the coping-stone will be put to a commercial organisation which has been for many years engaged with energy and consistency in working up to a definite end, animated by a lofty ideal—that ideal being to combine with artistic design and sound construction in furniture and decoration the lowering of the cost of production, so that beautiful things and harmonious *ensembles* may be obtained at far lower prices than have hitherto been paid in many cases for goods positively devoid of taste and badly manufactured. In fact, such is the reputation of the firm and the magnitude of its operations that every customer may be certain of getting *full value for his money*.

To the end thus aimed at Waring's have spent about two millions sterling in completing their vast organisation, establishing an unequalled studio of designers and equipping their factories with the newest machinery and the most seasoned and perfect materials. The new building will be a practical epitome of their policy; it will effectively illustrate the results they have achieved, and it will most certainly bring home to the invited guests and affords to the general public a large and convincing conception of the scope and purpose underlying the display. Next week's demonstrations will show what point furnishing regarded as an art has reached, what marvellous economies in manufacture have been effected, how completely every class is catered for, and what facilities are provided for those who require assistance or suggestions in connection with the furnishing and equipment of their homes.

Waring's business is thoroughly comprehensive in its scope. There are no fewer than 150 specimen rooms furnished in every style and ranging in price from £20 to £20,000. Here the visitor will find ideas enough to select from, and he can know at the outset exactly what he will get for his money. If he wants to furnish a whole house, Waring's claim to furnish "from the cottage to the palace" is practically and effectively illustrated. They have endeavoured, and successfully, to simplify the business of house-furnishing by the exhibition of a series of five model houses, ranging from a country cottage at £100 by gradations to £200, £300, £500, and £750. In each of these houses the prospective furnisher can see exactly what furniture, carpets, and draperies he will get for his money. It must not be supposed that these are the chief features. There are some forty great showrooms for the display of furniture of all kinds and periods: carpets (both English and Oriental), household linens, decorative fabrics, antiques, glass and china, pictures, electrical fittings, pianos and musical instruments, clocks and ornaments, plate and cutlery—in fact, everything necessary for the complete equipment of the modern home. For in their new home Waring's are carrying out a great expansion. They have added many new departments to their business, and throughout all these departments—which range from the simplest culinary article to the costliest suite—there runs the same dominant note of good design, sound workmanship, and much lower prices than have hitherto been possible. When the public see for themselves the way in which it is possible to secure really artistic work at a comparative economy of outlay they will be amazed, and every class of the community will be catered for. While laying themselves out, as heretofore, for the custom of those who can afford expensive furniture and high-priced materials, Waring's will be equally alert to secure the patronage of those who necessarily have to limit their outlay, but who, nevertheless, are resolved to obtain an artistic result for their money. The firm has already established their claim to achieve this in its former circumscribed premises; it will now, in its vastly wider area, and with its enlarged scope of operations, develop its great policy to the advantage of practically all sections of the householding community.

## CHAIN CABLE GROYNES.\*

[CONCLUDED.]

A perusal of Professor Boyd Dawkins' most interesting paper, "On the relation of Geology to Engineering,"† gives a better insight into the action of submarine springs in situations where glacial drift lies above the chalk, as it does in Yorkshire. The paper should be studied in conjunction with the opinions of Professor John Milne, Admiral Sir W. Wharton, Mr. H. Benest, Sir John Murray, and Messrs. Matthew H. and Kaye Gray.

The author would here draw attention to the danger of being led away by first impressions. It is to be regretted that so many of those interested in coast protection pay attention only to what they can see. The pounding action of the breakers, the tumbling cliffs and denuded beach all appeal to the senses and alone receive serious attention. The far more extensive areas of erosion below low water mark being practically neglected.

In most cases a little further study and research will reveal the existence of some hitherto unsuspected peculiarity—a newly formed submerged sandbank or an unknown deep current—which may entirely alter or modify one's ideas as to the best course to pursue.

If there is any truth in the foregoing remarks we are almost forced to admit that very much more observation and research are urgently needed, and that, since the circumstances vary so much in different situations, there is ample scope for the exercise of all the intelligence which could be placed at the command of a well organised Department of State.

It is now proposed to examine a few cases, together with some of the methods which might be adopted by different authorities; for, be it observed, unanimity of opinion as to the best devices to be adopted on various coast lines is at present by no means assured.

One can imagine, in the event of the Government acceding to the present outcry for State aid, what a varied assortment of designs would be showered upon the authorities in the hope of securing the spending of the first grant, and one can also imagine how extremely difficult it would be for the administration to decide between the conflicting opinions of the various experts competing for the honour of carrying out the work.

Very remarkable have been the opinions held by some with whom the author has been brought into contact. One said he never worried himself about anything he could not see on a shore; another held that the spray driven by the wind was the sole cause of all the trouble; yet another was of the opinion that erosion below low water level was impossible, because the travelling material, sand, shingle, etc., filled up any vacancies caused by the eroding influences; and one gentleman intimated that it was wrong to advance a theory which was not built up on what had gone before. These opinions, selected from many, are given in order to show how easy it is to follow in a groove. The inference being that as it has always been the custom or practice to look after the visible shore, and build walls, and erect groynes of a certain pattern, therefore any considerations not on these lines must necessarily be wrong.

Whilst urging on all young members of the profession the great importance of learning all they can from books recording the experiences of others, it is well to impress upon them the error of relying alone upon what others have seen and done, for this is not their "very own," and is only second-hand. Their "very own" can only be reached by efforts to gain what may be termed unaided solutions. It is easy to slide into the ready made groove, and in the blind acceptance of outside opinions lurks the serious danger of entirely, though unintentionally, quenching the spark of originality, which may be smouldering in the hidden recesses of the intellect.

The author hopes he may be pardoned for this digression, which has a distinct connection with the questions dealt with in the present paper, because, if he had followed in the beaten track, he would never have arrived at the conclusions now set forth.

Mr. A. Roope Hunt, of Torquay, who has done excellent service by recording in many valuable papers the results of his experiments and observations over a long series of years, produces ample evidence to show movement in depths of the sea far greater than those dealt with by the present author. Theoretically, the largest waves are capable of causing motion at about 40 fathoms, and, turn-

ing to the practical side of the question in support of Mr. Hunt, the late Sir James Douglass wrote that he "had been informed by fishermen at the Land's End that lobster pots were frequently filled with coarse sand and shingle during heavy ground swells in depths of water up to 30 fathoms, some of the stones weighing as much as one pound. . . . At the Bishop Lighthouse, on the westernmost rock of the Scilly group, coarse sand had been thrown during heavy storms from a depth of 25 fathoms at low water on to the lantern gallery, which was 120 feet above low water."\*

The soda water bottle, dredged up in 40 fathoms off Start Point, and produced as evidence by Mr. Hunt, and the proofs adduced by Mr. G. H. Kinahan as to movement of sands and gravels in 100 to 140 fathoms,† seem sufficient to show that material is moved in very deep water. For the purpose of the present paper, however, it will be sufficient to show that forces capable of moving not only sand and shingle, but of tearing from the sea-bed large masses of rock, are constantly at work during storms, in depths between low water and, say, 5 fathoms.

If we consider an average shore on which the horizontal distance between high and low water marks is 600 feet, and the distance from low water mark to the five-fathom line is one mile, we shall be able to realise what a large area of the invisible shore is being influenced by currents and waves in comparison with the visible shore.

Taking 100 feet of frontage, we shall have 60,000 square feet of exposed shore acted on by agencies which we see, but 528,000 square feet of invisible shore acted on by the unseen movements beneath the surface. The author directs special attention to this fact, because it is extremely important to keep it in mind when following up the arguments used by him in the present paper.

At the end of the author's paper, read before the Society of Engineers in October, 1904, a description was given of a chain cable groyne, which was hoped might be the means of guiding much of this travelling material. The following are the main features of this new groyne. To a heavy chain cable are attached bushes or other suitable obstructions, until the chain is converted into a veritable flexible hedge. When used on the visible shore, the chain is strongly pinned down to the shore by iron bars or piles, and is laid in deeper water from L.W.M. by paying out from barges or lighters. When the flexible hedge or groyne has been placed in position, seaweed and other travelling material collects in and around the hedge, and the obstruction begins to cause a slowing down of currents, and to encourage the deposit of all kinds of detritus.

A typical section accompanies this paper showing the submarine chain cable groyne from A to B, the foreshore portion being that from B to M. A, B, C, D, E, F, is a section of the shore from the lowest point (where the sea end of the chain cable is anchored, or fastened, to a heavy block of concrete at A, and secured to a strong pile at B, near low water mark) up to the top of the cliff at F. The shaded part shows the sectional area of that portion of the groyne composed of crates, trees, bushes, etc., which influence the currents and encourage the collection of travelling material. A, B, C, D, E, show concrete sinkers, to be used where the chain is light. The portion between the heavy lines shows a covering of sand, gravel, or shingle, as the case may be.

It is almost needless to say that the author would never have thought of this groyne, had he not first satisfied himself of the existence of erosion in deeper water, and also felt convinced that to deal with that erosion, methods must be sought in advance of those already in vogue. The new groynes have their advantages, for they are flexible, and therefore accommodate themselves to the inequalities of the sea-shore or sea-bed. The main portions are very durable, and cannot be lost or destroyed in rough weather; they are very easily constructed and placed in position. The cost of construction and maintenance, also, is very small, and, should they prove ineffective on any shore, the chains and other ironwork can always be removed and sold again as scrap at but little less than the original cost.

But they also have their drawbacks, for, on a shore where there is a severe travel of heavy shingle, they are troublesome to maintain, because the bushes are stripped off the cable by the constant battering of the waves. In such cases it has been found necessary to use strong hoop iron to bind on the bushes, and this method seems to answer well. This form of groyne is also being now tried on sandy shores, where there is very little shingle, and it is hoped they may give good results in these situations.

As it is impossible to erect groynes of the Case pattern, or, indeed, any rigid form of groyne, in depths of water

\* A paper read by R. G. Allanson-Wynn before the Engineering and Scientific Association of Ireland Meeting on 28th May, 1906.

† The "Fam. s. Forrest" Lecture, March 17th, 1893, Proceedings of Inst. C.E. Vol. CXXXIV.

‡ Submerged Chain Cable Groynes. Society of Engineers, March 5th, 1906.

\* Except Mine. Proc. Inst. C. E., Vol. XI., p. 46.

† "Tidal Currents and Wind Waves" by G. H. Kinahan, M.R.I.A., Public Works, Quarterly Vol. V., Jan.-April, 1905.



from, say, 1 to 10 fathoms, except possibly at very great cost, we have to look around for the best substitute we can find for influencing and guiding material travelling in those depths. The author does not wish to assert that the cable groyne is the best means which can possibly be adopted, but he can think of no other which combines so many advantages, and, in view of the numerous instances in which simple contrivances have been completely successful, he thinks that the idea is worthy of careful consideration.

If the situation to be protected is of very great importance, such as a harbour or railway line, and "money is no object," then we can usually make matters safe by opposing the forces of Nature by main force. Foundations are taken far below low water level, stonced concrete blocks are laid and walls are built capable of resisting the shocks of the heaviest seas. Such works we see at Holyhead, Plymouth, and Dover, but they have all been carried out at very great expenditure of money, and when it comes to dealing with places where only a very small outlay is possible, as in the case of agricultural land, we have often to admit that it is far cheaper to let the land go than to attempt to protect it.

When it comes to a question of protecting building land, seaside resorts, etc., a large expenditure is often permissible, and there is great scope for the exercise of judgment, skill, and experience.

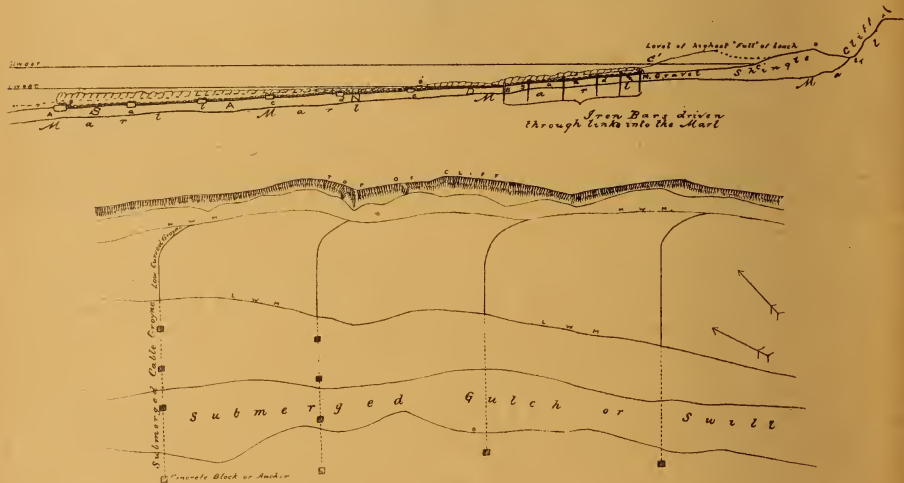
There can be but little doubt about the effectiveness of

which is steadily going on in many places, in deeper water outside their influence, and it is mainly in consequence of following up the theory and practice of low groyning that he has been able to arrive at the conclusion that, where deep sea erosion is steadily progressing and soft material extends to depths far below low water level, protective measures can only be regarded as palliative.

On the Bray shore the advance of low water mark is immediately traceable to the erosion taking place below low water level, no doubt accentuated by the scour from the high sea wall, and there appears but little doubt that the toe of the wall has been protected by the action of the low groynes which have, so to speak, kept that important portion of the shore clothed in shingle.

Putting two and two together, the author believes that, in very many cases, a judicious combination of slanting groyne and low groyne may be highly advantageous to shores which are undergoing rapid erosion, because such a system would be most likely to keep Nature's protection, or clothing of sand and shingle, in place.

There are occasions when a wall may possibly be far too expensive, or altogether undesirable on account of insecure foundations, and the author has suggested a form of curved slanting groyne, which he believes embodies the advantages of both systems. The curve, joining the two, offers no direct opposition to the action of waves or currents, and softens down the angle which would otherwise exist. Our



well-considered groynes, but solid walls unsupported by groynes are often undermined when low water mark pushes in and destroys the foundations; indeed it may be truly said that many a wall contributes to its own destruction through the scour set up by the re-action of the sea after dashing against its face.

Groynes may be either placed at right angles to the coast line or slanting, and the author, who has had excellent opportunities of carefully watching the effects produced by different kinds of groynes in situations where the conditions as regards range of tide, exposure, nature of material, etc., have differed widely, as a result of these observations, believes that on most shores low groynes should be relied on for a collection and retention of material, because their action is gradual and certain and not productive of scour. Experience also shows that these groynes act far better in some places than they do in others, though they invariably have a beneficial effect. The idea of carrying the groyne well down to low water mark is an excellent one, because the greatest visible area, over which travelling material is moving, is affected, and, consequently, the greatest chance is offered for adding to the accumulation of natural protection. Having first tried slanting groynes between high water mark and mean sea level, and then having had the advantage of applying the Case system of low groyning to shores presenting especial difficulties, the author became an ardent supporter of the low groynes, which he still advocates in preference to all others.

It has occurred to him, however, that the low groynes, though extending to the lowest possible point on the visible shore, do not extend far enough to influence the erosion

aim should be to coax or "wheedle" the turbulent forces with which we have to deal, so that they will do our bidding.

The action of the slanting portion of the groyne differs from the action of the ordinary low groynes which act on the lateral currents by slowing them down and causing a deposit of material which would otherwise pass away. The curved slanting groynes rely almost entirely on the agency of the waves, and trap and detain shingle which is thrown over from windward to lee.

It is instructive to spend a few hours in watching the result of a dead-on-shore gale on slanting groynes. If there is much travelling beach it will be observed that the shingle—often consisting of heavy stones—is bodily carried over the top of the groynes and retained on the lee side, where it is required for the formation of the "full." This retention is due to the circumstance that the slanting groynes, running diagonally up the beach, are inclined at a much flatter gradient than those groynes running at right angles to the coast line, and, therefore, the retreating volume of water which causes the scour has less power to carry away the deposited shingle. On the same principle a very rapid mountain torrent will carry down huge boulders, which would rest peacefully for ever at the bottom of the same river when it emerges into flatter lands and winds amongst the lower valleys.

The slanting groynes recommended form a continuation of ordinary low groynes from mean sea level up to high water mark, and they are constructed on much the same simple principles, but the timber has to be of heavier scantling because of the pounding action of the sea in rough weather. Here it may be observed that, in selecting our

timber, we must be guided by the position it is to occupy on the shore as well as by the size and quality of the shingle composing the beach.

Experience seems to show that, when acting on timber—especially vertical piles—the sawing action of sandstones is worse than that of rounded flints, though the latter may have a more erosive effect on the faces of the sea walls. Where piles have been driven anywhere in the neighbourhood of high water mark, in localities where there is a heavy travel of beach, it will often pay to protect the windward piles, at the portions where they are most subjected to the sawing action of the shingle, by angle iron, or, better still, by nailing on planks, which can be renewed when worn through. This may seem a small point, but it is one which should receive attention. The life of the windward piles may be doubled or trebled by attention to this detail, and much expense saved in repairs and general maintenance.\*

The idea of using slanting groynes is not by any means new, so that the author disclaims any title to originality under this heading. There appears, however, to be some indication of novelty in the idea of a curved groyne gradually working up from a low groyne until it has reached the limit of high water mark, and the advantages of such a groyne may be best worked out theoretically by first of all considering some of the most important phenomena and conditions obtaining on the generality of shores.

It will be at once conceded that the steepest line of descent on any shore is found by taking a section of the shore at right angles to the coast line. It follows, then, that when originally constructed, all groynes running at right angles to the coast line have, on either side, the steepest possible gradient on that portion of the shore.

It will probably be also admitted that, if the groyne be run out in any other direction whatever on either side, the gradient will be less steep because the line will run diagonally up and down the beach. The maximum of steepness is shown by the sectional line at right angles to the coast line, all other lines gradually diminishing in steepness from a degree up to 90 degrees, when the minimum is reached at dead level with the original point of starting.

It can also be easily proved by elementary mechanics that bodies more readily slide down steep inclines than they do down inclines which are not so steep, and that, where the action of water is concerned, heavy boulders and shingle of all sizes are readily moved in rapid rivers, and that they are not moved at all, or only very slightly, in sluggish rivers.

Following up this line of reasoning, we arrive, in a very few steps, at the conclusion that the important point is the steepness of the gradient, and that where scouring action is to take place, it will, *ceteris paribus*, be worse on the lee side of those groynes which run down the steepest gradient. It can also be demonstrated that the less steep the gradient the longer it takes the water to run off by filtration or percolation, or by running down the lee side of the groyne, and that, therefore, material of all kind has a better chance of being retained where it is wanted.

It can also be readily shown that those proposed groynes (being constructed as described in the author's recent paper and read to the Institution on January 9th) are not of the nature of solid immovable structures, and can always be lowered or raised to meet the circumstances of the case at any moment, and that, therefore, they must not be included in the list of dangerous solid obstacles at high water mark.

The author remembers some years ago showing a rapidly disappearing coast to a gentleman who, after a short inspection of waves and cliff, said cheerfully, "This is very easy; why don't you build a wall?" Here prejudice—prejudice in favour of building walls—came out. As a matter of fact, the erection of a wall at that spot would have been not only costly and useless, but would have increased the rate of erosion very considerably. The advice to "build a wall" was given in all good faith, but with a complete want of knowledge of the conditions obtaining. Ignorance, that constant henchman of prejudice, was, no doubt, greatly responsible for the advice, which was further backed up by a sketchy and undefined idea, that waves should not be unaccompanied by walls.

Whatever sets of conditions have to be dealt with, all the arguments in the world won't alter their existence. What we have to do is to find out all we can about them, and then take such practical measures as will secure the best results in all circumstances, *i.e.*, having regard to the value of the land, length of time the protective measures are expected to last, and the means at the disposal of the owners.

In order to influence the disposition of material, which he believes he has conclusively proved to be moving in depths far beyond the reach of any rigid form of groyne,

the author has recently designed the above described chain cable groynes, which can be utilised in all depths of water.

As some misconception appears to exist respecting the scope of these groynes and the best methods of maintaining the works when completed, attention is called to the following points, which are of the greatest importance in connection with the application of the system.

There is practically no limit to the depth in which these cable groynes can be laid—it is as easy to pay them out into five fathoms as it is into five feet of water, and the moment they reach the bottom they conform to the irregularities of the sea bed, and it is thus possible to deal with submerged swills or gulches in almost any depth where material is moving and where it may be desirable to bring about accumulations.

Thus, it appears, that with the chain cable system the cost of construction remains constant for all depths, whilst with the solid groynes the cost is known to increase enormously as the advance is made into deep water.

With regard to maintenance, it has been proved by experiment on one of the worst shores in the kingdom that the bush attachments soon wear away when exposed to the travel and pounding action of heavy shingle, and that where there is only sand, or where the groyne is lying entirely below low water level, and therefore not exposed to the action of breaking waves, the attachments last much longer. The inference appears to be that wherever we find a heavy shingle bank, acted upon by breaking waves, solid groynes should be employed on the visible shore and flexible chain groynes on the sea bed below low water level.

In the case of a sandy shore with, perhaps, only a light travel of shingle, it may, however, be advisable, for reasons of economy, to use chain cable groynes entirely, as is now being done on a shore not far from Dublin. On such sandy shores the maintenance of that portion of the groyne which can be got at between high and low water marks, presents few difficulties, and only requires a little watchful care and a small outlay in unskilled labour; but when it comes to repairing the portion of the groyne which is always submerged below low water level, the difficulties are much greater, for, as has been recently pointed out, it will be troublesome as well as undesirable to disturb the buried chain in order to repair its attachments. A far better plan is to run out a second cable groyne to support the first and still further add to the desirable accumulations, plainly indicated by the burying up of the first chain. Even a third groyne may be run out if the results of the first two are favourable, for the system is so economical that the cost of three dressed cables will be insignificant compared with the outlay required for the construction of one rigid groyne, either of timber or concrete. It will also be noted that the bush attachments, if properly fastened to the cables, will last for many years, as they will be always submerged and not subjected to the rotting effects of alternate wettings and dryings.

## OUR ILLUSTRATIONS.

We publish as a supplement to our present issue a perspective drawing of the new shops lately erected in South Great George's-street for Mr. F. Hafner, from the designs of Mr. Henry J. Lundy, M.R.I.A., architect, 38 Dame-street, Dublin.

The houses we illustrate are designed as first-class business premises, and reform this portion of one of Dublin's best business thoroughfares. The portion of the premises retained by Mr. Hafner in transferring his business across the street comprises a well-laid-out dwelling, with spacious machine room, and boiler house at rear, well appointed with latest improved machinery and refrigerator plant. This shop is elaborately fitted, Fiance counter front, tiled walls and floor by Messrs. Carter, Poole, Kinnear and Gager patent steel ceiling in high relief, Coburn's patent trolley rails, etc.

The front elevations are faced with Portmarnock bricks, with Skerries limestone cornices and dressings, Peterhead red and grey polished granite.

The builders were Messrs. J. and P. Good, Limited.; shopfitting by George Squire, Kingstown, and Messrs. Dockrell; electric lighting by Messrs. Kerr; painting, McCulloch and Nairn.

A young man in Staffordshire recently adopted a strange and exceedingly gruesome method of committing suicide. Having been disappointed in some love affair, he cut his throat with an electrically driven circular saw. He left a note to his father signifying his intention of destroying himself.

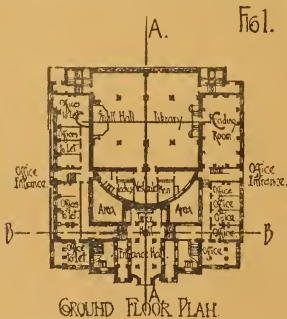
\* "Transactions of the Institute of Civil Engineers of Ireland" Vol. XXVIII., 1905, pp. 146-150.



## AXIAL PLANNING.

It is often said by foreign critics that English architecture lacks the element of study which is so pronounced a characteristic of Continental work. Unfortunately, there is a good deal of truth in this, and to a large extent it is undoubtedly due to our neglect of certain great principles, amongst which that of axial planning is one of the most prominent. Tracing back the history of architecture throughout all ages, it is found that this principle predominates, not in one period, but in all, where great schemes are concerned. In the Egyptian works it is in strong evidence, the great Temples of Thebes being all arranged with an axial corridor and carefully managed minor axes. The Greek temples are similar, and not the temples alone, but the general building schemes of which they formed a part. Roman work, as we know, is based upon the Greek, in this as in most other respects, and the Renaissance was based upon the Roman. All this is a natural sequence; but the Gothic spirit is so utterly different from that which permeates all Classic types that it might have been thought that this principle would not govern the great building of the Gothic period; yet the churches at least have the same central axial arrangement as have the Basilicas of Rome or the temples of Greece and Egypt, though, upon military grounds, the castles are differently planned.

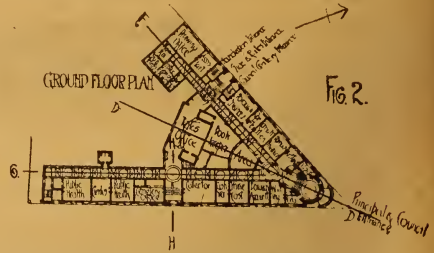
There is no gainsaying the fact that the present is a Renaissance period, and it consequently follows that the principles which have been successfully applied to classic architecture in the past should apply equally well to that of the present day. In small works, particularly private houses, we generally plan upon a Gothic system, which has come down to us rather from the castle than from Ecclesiastical architecture. As a result, we build for convenience rather than for dignified effect. In all greater matters, on the other hand, we now adopt some phase of the Renaissance, and it would be well if we were to follow the Continental fashion of basing our plans upon an axial system. Now and again we find that this is done, and always with good effect. This has been shown in a few recent competitions. Mr. Gibson's plan for the Wesleyan Methodist Hall (Fig. 1) has a central axial line, which is in the form



of a corridor from the entrance doorway, until the pair of doors to the small hall and library are met, this axial arrangement being particularly noticeable in the entrance-hall. At the junction of the entrance-hall and inner-hall the axis is crossed by a secondary axis lettered B B, off which, however, things do not pair so completely as they do off the main axis. When the small hall and library are thrown into one, they form a hall which is again axial in its arrangement, with a wide nave and comparatively wide aisles, this axis C C crossing the major axis A A at right angles. The scheme is a simple one, of a type which may be traced back, as we have already said, to the earliest times; but it is as applicable now as it always has been, and is as productive of good effect.

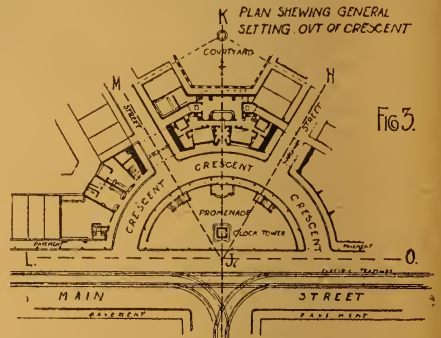
A further developed example is Messrs. Warwick and Hall's successful design for the Lambeth Municipal Offices. (Fig. 2.) This building occurs at a sharp angle, and the axis is obtained by bisecting this angle, the design being symmetrical, though not identical, on either side of it. The axial corridor only extends from the entrance to an inner hall, and there diverges to corridors on right and left, forming radial axes from the main axis. It will be seen that the major axis is lettered D D, and these two radial axes E F and E G. Of these E G is again crossed at right angles by another axis, H H, which serves to dominate the

elevation to Brixton Hill, while a somewhat similar arrangement occurs on the other frontage. The idea of splitting the axes into two divergent axes is by no means new; but



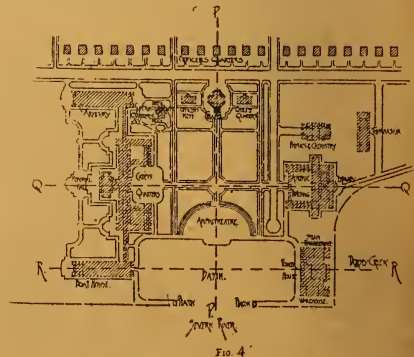
it is used here with some ability, and in a manner which is highly instructive and well worthy of consideration. The plan is thereby rendered something quite different from the usual haphazard schemes submitted in English competitions.

A very similar idea dominated the design for a crescent by which the Tate Prize was won in 1913 (Fig. 3). The plan



shows a central axial line, J K, off which everything is symmetrically designed; but from the point J there radiate a series of axes J L, J M, J N, and J O passing down various streets clear of obstructions. This is again a case of divergence of axes or radiation, the whole effect being most perfectly visible from the point J; for it may be noted that one of the great advantages of axial arrangement from an architectural point of view is that of obtaining a series of vistas. Convenience is also secured, for it is always easy to find one's way about an axially planned building.

Although these English examples are sufficient to show that the principle of axiality is becoming recognised, yet there is none in which it is so perfectly developed as in Mr. Ernest Flagg's scheme for the United States Naval Academy



at Annapolis, illustrated in Fig. 4. This is an almost perfect example of studied planning according to recognised rules and principles, and may be taken as being typical of

modern French work, Mr. Flagg having been educated at the Ecole des Beaux Arts in Paris. The scheme is controlled by two axes P P and Q Q, which cross one another almost centrally at right angles, both of them being rather axial passages than axial lines throughout their whole extent. The planning is not entirely symmetrical of either of them, while each individual building has its own independent axis or series of axes. There is, for instance, a supplementary axis R R, which passes through the boat-house, the basin, and the tower-house; but where it traverses the boat-house occurring only as one of the several minor axes of the cadets' quarters, which is planned as a hall off the great axis Q Q, which serves likewise as the principal axis of the academy building. It would probably cause confusion rather than elucidation if all the many axes were shown upon this plan; but it will be seen that the adoption of axial arrangement, not only in each individual building, but in the relation of building to building, has led to directness and simplicity, and the production of admirable vistas, and this in spite of an irregular site, occasioned by the Dorsey Creek, which would have led many architects to have despaired of producing a formal architectural scheme.

In emphasising so strongly the need for axial arrangement, if successful planning of big schemes is to result, it is not to be thought that this is the only element tending to success in this direction. It is, however, one of the most important, and one of the most neglected by English architects, while it is one of the first that is insisted upon by the great French masters of the art of planning. No more severe criticism can be passed by one of them than to tell his student that he does not yet know how to lay down an axis. On the other hand, English architects hardly understand this to be a leading necessity, being too much accustomed to deal with small and irregular buildings.—*The Canadian Architect and Builder.*

## ARCHITECTURAL ASSOCIATION OF IRELAND. JOTTINGS.

### Ring Out the Old.

The retiring President, Mr. Harry Allberry, received a very hearty vote of thanks for his willing and able services to the Association during his term of office.

### Ring In the New.

Mr. Holloway has accepted the vacant chair, and will, we have no doubt follow worthily in the footsteps of his predecessors.

### The Prize Winners.

The following is the "List of Honour" for the past Session:—

The Institute Prize	...	Mr. A. W. Reid.
The Travelling Studentship	...	Mr. C. G. Ramsay.
The Lynch Prize	...	Mr. H. G. Leask.
The Downes Medal	...	Mr. G. F. Beckett.
Architectural History Class, 1st	...	Mr. T. F. Strahan.
Building Construction Class, 1st	...	Mr. P. J. Munden.
" " 2nd	...	Mr. J. W. Beckett.
Design Class, 1st	...	Mr. C. Keefe.
" " 2nd	...	Mr. P. J. Munden.

### Remarks.

There was an excellent competition this year for the Institute prize, four very good sets of drawings being received.

Mr. Ramsay thoroughly deserved the award of the Travelling Studentship for his fine set of drawings.

It is to be regretted that there were not more applicants for the Downes Medal, as this is a prize more open to the general body of members (including those in practice) than competitions which require much time and preparation. This medal has been presented by Mr. Allberry, and is for a portfolio of sketches of architectural work.

It should be stated that Mr. J. W. Beckett took second place in the Architectural History Class, but owing to the fact that he obtained the second prize last session, the by-laws prevented him from receiving the prize this year.

### The Excursion.

Mr. Bradbury has prepared with great care a splendid programme for the excursion, which is to start on July 10th. Details will probably appear in next issue.

### The Museum.

Manufacturers will please note that applications for space in the Museum of Building Materials should be made to Mr. A. G. C. Millar, at 15 South Frederick-lane, Dublin. Shelf space, 12 inches deep, 18 inches long, and 18 inches high, can be rented for the sum of 5s. per annum.

There are indications that this Museum will be of great value to architects in the city, both for examining and comparing materials and showing same to their clients, and will probably be largely used in the future for these purposes.

## THE TESTING OF OIL VARNISHES.

In the May number of the *Decorator*, which is described as the "new paper with the red cover," there is an article on "The Testing and Valuation of Oil Varnishes," by J. Crookshank Smith, B.Sc., F.C.S., M.S.C.I., which is of much interest to painters and decorators, as well as to architects, engineers, and all others who desire to get a covering used that will either develop the appearance of the surface treated, or else contribute in the best way towards its preservation. The author points out the danger of relying upon tests as a criterion of excellence, and says:—"There are many persons who look upon chemical analysis with feelings of greater veneration than the occasion always warrants. Regarded from the point of view of technical valuation or testing, analysis is only a means to an end, that end being to enable the analyst to form an opinion as to whether the material under examination is likely to behave satisfactorily in use." And he points out further, that most of the research hitherto carried out has been directed to assisting the varnish maker rather than the user. He goes on to describe a number of tests, physical tests, practical tests, drying tests, natural drying test; the procedure in this latter case he describes as follows:—"The varnish is poured on a clean, dry glass slip, 2 inches by 6 inches in sufficient quantity to cover three-quarters of the slip. The various slips are then stood vertically upright for five minutes in order that excess of varnish may drain off. Any drops that adhere to the edges of glass are carefully removed with blotting paper and the slips are then placed on racks inclined at an angle of 10 degrees. The temperature is maintained at as near 60 deg. F. as possible, not more than 2 deg. variation either way being permissible, for 24 hours. No ordinary oak, copal or carriage varnish of good quality will be sensibly tacky to the touch after 12-14 hours. Twelve hours may be regarded as a satisfactory limit for house-painters' varnishes and eighteen hours for coach-painters' and extra pale varnishers. After drying the film should be transparent, free from specks, lustrous, and hard, yet elastic. Out of a series of 124 varnish samples examined, 21 were rejected as not satisfactorily passing the test. Of the 21 ten were rejected for obvious faults such as lack of lustre, liability to bloom, etc.; the remaining eleven were subjected to exposure tests with the result that 9 proved unsatisfactory, while 2 were satisfactory. The balance of evidence then in regard to this test goes to show that the varnish which does not comply with the requirements of the test will most probably be unsatisfactory in use.

This test, therefore, appears to be the most practical and easily applied. In connection with the use of varnishes there are also used the forced drying test and air drying in conjunction with a pigment.

The author concludes by expressing the opinion that, by means of specially-planned practical tests requiring neither expensive apparatus nor elaborate chemical training, very fairly reliable judgments may be formed as to the quality and value of competitive samples of varnish. The observer, however, must be careful and accurate both in observing and interpreting results, because the sources of error to which the untrained experimentalist is liable are numerous, and the personal equation is prone to predominate.

We regret to announce the death of Mr. Henry Watson, late managing director of Messrs. Clayton and Shuttleworth, Ltd., of Lincoln. Mr. Watson went to the Stamp End works fifty-four years ago, when at that time they employed only eighty men. There are now over 2,000.

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## MUNICIPAL OWNERSHIP IN GREAT BRITAIN.

No subject of the day, political or social, has aroused more interest or greater interest than the big problem of municipal ownership. The thing is in principle eminently socialistic, but it has during the past quarter of a century attained such proportions as to be far removed from the realm of experiment. Yet we still find, as in most other matters, that there are two sides to the question, and we get an array of opinion on either side. On the one hand we have those who continually, and without cessation, press, more and more vigorously, and with every element of wide application, the principle involved; while, on the other hand, we find those critics who, in season and out, challenge every attempt of a municipal authority to undertake any enterprise beyond that of cleaning the streets. To-day it may be a big new technical school, an institution of undoubted advantage to the community in training the hand, eye, and brain of the worker. To-morrow it may be a purely commercial speculation, like the ownership of tramways with cheap halfpenny fares. The Macmillan Company, of London and New York, have just sent us a remarkable volume entitled "Municipal Ownership in Great Britain," by Hugo Richard Meyer, Professor of Political Economy in the University of Chicago.

At the very outset he tells us that Great Britain's traders, manufacturers, and capitalists (alas, not Ireland's) have a record for venturesome investment of capital both at home

and abroad, that expands over centuries, and shows no signs of abatement. He gives us another interesting piece of information, that in the engineering trades—to which all public services belong—Great Britain is second to no other country—in fact that, per 10,000 of the population, she has twice as many persons employed, and considerably more than double the volume of exports in money's worth.

One of the earliest private electrical installations in the world was that of Sir William Armstrong at Cragside, though the plant was designed by German engineers, the Messrs. Siemens, of Berlin. On the other hand, almost the first practical electrical tramway in the world was that between Portrush and the Giants' Causeway. "British names," says Mr. Meyer, "preponderate in the practical application of science, which, in the development of pure scientific research, Great Britain has unquestionably held her own with the world." This testimony, although only a quotation on the part of the author, is valuable as coming unchallenged from an American writer.

He tells us that so far back as 1858 there was an effort to promote a "street railway" in London. Sir Benjamin Hall, Chief Commissioner of Works for the Metropolis, moved the rejection of the Bill, and declared it to be "a monstrous proposition." In 1861 the House of Commons rejected an application for a charter to legalise "a mode of public conveyance by means of iron rails, in the public streets," while previously, in 1860, some capitalists had built a street tramway in Birkenhead. In 1863 Mr. Train, without authority from Parliament, laid down a tramway from Burslem to Hanley. The succeeding years up to 1869 witnessed the constant repulses of those who sought to obtain statutory powers for this mode of traction.

Mr. Meyer's work is so full from cover to cover of interesting accounts of the history of enterprise in tramway work, the author admits that it is not necessary to go to the United States for comparisons. For Dublin, which he describes as "rather a sleepy town," had in 1904 one mile of street track for each 3,500 people as against one mile for each 6,700 people in that go-ahead municipality, Glasgow; while Boston, U.S.A., had one mile for every 2,300 people, or three times the facilities of Glasgow, which shows us that we are not quite so behind the times as is often supposed.

It was in 1894, that Mr. W. M. Murphy, who had been building tramways since 1868, saw the possibilities of electric traction for Dublin. In the year 1894, Mr. Murphy first proposed to the Corporation to electrify the street traction. As soon as the adherents of municipal ownership in England and Scotland, Mr. Meyer tell us, heard of the proposal they sent over agents to Dublin to work up sentiment, and actually prevented Mr. Murphy from getting the approval of the city until late in 1895. However in 1896 electric traction had begun in Dublin. The foregoing account is taken from the report of the Select Committee on Municipal Trading, 1900.

Mr. Meyer declares that the City of Glasgow's much vaunted policy of operating the street railways as money-making machines, has been little short of disastrous. The City of Boston trams serve a smaller population than Glasgow, yet the private enterprise in the former city pays annually 1,555,000 dollars a year to the relief of taxation. On the same basis Glasgow, from an adequate system in private hands and properly worked, could derive a much larger sum than Boston does.

The time and space at our disposal does not permit us to follow Mr. Meyer through the whole of his able arguments, which are, on the whole, decidedly against municipal ownership as opposed to private enterprise. He deals in turn with

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the experiences of the chief cities of the Kingdom, not only as regards trams, but also lighting and other matters.

At this time, when municipal enterprise has piled up a public debt, that bears no insignificant proportion to the National Debt, and when sensible men have pretty generally come to the conclusion that it is time to at least enquire whether we should not cry "halt." A perusal of Mr. Meyer's work may be of advantage to even the most aggressive champion of municipal enterprise and cause him to pause for consideration.

It is one thing to take up an urgent, pressing matter, such as the housing of the poor, if private enterprise refuses to do it, or cannot profitably undertake the responsibility—it is another matter to rush into the market to compete with private enterprise.

In concluding, Mr. Meyer reminds us that, "Industrial progress comes not from the people at large, whether acting as individuals or in the Corporate capacity of city or State. It comes solely from a comparatively small body of men of unusual imagination, daring, power of persuasion, and executive ability." The saying is trite, though the choice of adjectives lays itself open to slight misconception.

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## COMMENTS.

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### The New Labourers' Bill.

In an interesting article on the new Labourers' Bill, the *Sligo Champion* observes, that "The proposed changes under the present Bill will greatly facilitate the acquisition of sites, and largely reduce the expenses incurred under the old procedure. Appeals to the Privy Council are to be abolished and the decision of the Local Government Board will be final. This will save the heavy bills of lawyers under the old system. Uniform plans are to be furnished by the Local Government Board, so as to reduce architects' fees. On this point, however, we may remark that we have frequently seen very useless plans issued by the Board of Works and Local Government Board, which gave very little satisfaction, and afterwards occasioned much expense in repairs and alterations. We would recommend District Councils when they have got a good plan to stick to it. Further economy is to be effected by the abolition of all fees for registering titles, all charges for searches of titles in the Registry Courts and the Registry of Deeds, and all stamp charges whatsoever." The proposed scheme of free plans will not effect a saving of 15s. per house all round, and it is to be hoped that in the interests of the ratepayers and of honest dealing, that the Councils throughout the country will have the wisdom to adopt the *Champion's* common-sense advice; and, further, to raise the standard of qualification for men employed as architects in such important schemes. The Councils will find it the cheapest policy in the long run to employ a respectable architect. Besides, the requirements and building facilities of every district differ, and can only be justly appreciated by a competent and experienced architect.

### The Seething Pot—Architecture in Irish Fiction.

From time to time one finds some criticism of latter-day architecture in novels—usually silly or ignorant, occasionally amusing, but seldom serious; to the latter category must be said to belong some of the references to current Irish ecclesiastical architecture in that much-talked of work, "The Seething Pot," a picture of Irish politics and social life that has engendered much controversy of an almost bitter character. The architectural criticism, if scathing, is still undoubtedly a serious criticism. The following are a couple of the most striking passages: The town of Clogher is a small Western town, towards which the traveller is slowly making his way by the tedious, toilsome line that thinly veils the identity of the "North Mayo line"—

Henceforward the country grows, if not beautiful, at least deeply interesting. The train crawls more and more slowly through Roscommon and across Mayo. The traveller can study in detail tracts of bog, patched with bright green fields or black ploughed land. Farmhouses have disappeared, and their place is taken by thatched cabins, with lean, small cattle and bare legged children round their doors. The stoppages become more frequent. From every station little huddled towns are to be seen, each a shade shabbier than its sister next on the east. The spires and towers of great garish churches overtop and dwarf the houses. Featureless ranges of convent buildings have seized the vantage-ground of neighbouring hills. The church has dominated these towns, but not, as sometimes in England, where a minster looks down like a venerable mother upon the streets beneath. Here the ecclesiastical buildings are obtrusive, self-assertive, new. Bedraggled houses cluster round them, less, it seems, because they love them, than from a desire to share a spurious smartness.

The town of Clogher consists mainly of one long street, which runs straight to the gates of Sir Gerald's demesne. At one end stands the Roman Catholic Church, obtrusively raw and remarkable, even among Irish Roman Catholic churches, for the peculiar hideousness of its architecture. It is much to be desired that the authorities of Maynooth College would appoint a Professor of Ecclesiastical Art. He might then hope to hear some Archbishop launch an excommunication against the architects who design these buildings. It cannot but be subversive of the faith and morals of a people to be obliged every day to look at edifices of which even an English churchwarden, bent on restoration, would be ashamed. At the other end of the street, on a patch of ground cut out of the demesne, stands the fane of the Church of Ireland. It has turned its back deliberately, even ostentatiously, on the town. With the locked gates that lead to it, the gravel walk is smoothly raked, and the grass on the graves trim and tidy. The edifice itself is decent, according to the conception of the old Ecclesiastical Commissioners. Compared to its new and wealthier rival, it has the prim air of a decayed gentlewoman in the presence of some self-assertive *nouveau riche*. Two banks, a courthouse, and a workhouse make up the rest of Clogher's public buildings.

### The Dust Problem.

The extraordinary development in the use of motor cars has not been altogether an unmixed blessing to the cyclist and the pedestrian. The main roads radiating from Dublin are at this season at times anything but pleasant for them to travel over. The efforts of the road authorities to improve the surface have in South Dublin been crowned with success, and were it not for the dust nuisance would afford almost ideal highways for cycling. Riding out of town along the Stillorgan-road early the other morning, just at the hour when people residing in that important and rising district were coming into business, countless motor cars passed us, smothering us in a perfect cloud of fine white dust. Scarce had one passed when, without giving us breathing time to clear choking throat and nostrils, than another was upon us. The roads have been made so good under the sway of our present energetic Co. Surveyor, Mr. Collen, that they have tempted nearly everyone who can afford it to invest in a car. The dust problem has become a very real one, not only here, but throughout England, and is a question that must sooner or later be faced and effectively dealt with. The "Northwich (Cheshire) Chronicle," in a recent issue, gives some account of certain interesting experiments made by the surveyor to the Urban Council, Mr. J. Brooke, who has drawn up an exhaustive report relating to the use of calcium chloride for the purpose of laying the dust. It should be observed that a road to which calcium chloride has not previously been applied should be watered thoroughly twice over with this solution, an interval of one day being allowed to elapse between the first and second watering. For this first treatment, a length of 100 yards of road eight yards wide, this is 800 square yards, will require about 600 gallons of the solution—about 300 gallons for the first watering and another 300 for the second watering on the next day. For subsequent treatments, one thorough watering will suffice each time, using about 300 gallons of the solution per 800 square yards, and this will probably have to be repeated

about four times a year on an average, but it is, of course, impossible to give a quite definite figure, as so much depends upon the dryness or otherwise of the season, the quality of the road, and the quantity and character of the traffic.

In the course of his report, Mr. Brooke observes that the calcium chloride, as used in Northwich for experimental purposes, was obtained in liquid form taken from a standpipe especially fixed for the purpose and discharged into the ordinary watering cart. During the experimental stages, Messrs. Brunner, Mond, and Company charged 3d. per cart load of about 300 gallons. The first length on which the liquid was applied was Winnington-lane from Solway-road to Oldham's Hill, the weather being free from rain at this period and the wind north-easterly. The length was 900 square yards, and the width 8 yards. The cost of treating this for 14 days was 18s. 3d. After the liquor had been on the road for 14 days rain fell, and actually revived the effects of the treatment. The same length of roadway watered in the ordinary way with water from the standpipes in the road would have cost £2. No. 2 length was Chester-road, from Greenbank to Danebridge, 1,666 yards by 9 yards wide. In this case the liquid had to be carted about  $1\frac{3}{4}$  miles. The cost, for 14 days was £1 16s. 7d., and ordinary watering would have cost £4 3s. 7d. The third length was from the Council Offices to Wadebrook, the length being 1,566 yards by 8 yards in width. In this case the liquor had to be carted over two miles, the cost being £1 16s. 4d., as against £8 6s. 8d. ordinary watering. The above figures show a decided decrease in cost in the face of the distance the liquor had to be carted, and the effect in laying the dust is satisfactory. The surveyor adds that it has long been his opinion that a cheap material, which would allow of frequent application, was the only one which would be acceptable to public authorities, considering the present construction of macadamised roadways. The liquor has the characteristic of absorbing the moisture from the atmosphere, consequently the evaporation, which is a failure in the use of water, is eliminated, with the result that each night the road surface regains an amount of moisture which thus prolongs the effect of the treatment. It also has a decided advantage over water when the cost of maintenance and the cleansing of the road is considered. Therefore, it is an advantage from a public health point of view.

The great difficulty has hitherto been the question of cost, as in many places watering has never been introduced, and in such weather as at present prevails the effects of ordinary watering would be extremely transient. So that the suggestion of using a chemical, cheap, and at the same time, more lasting in its effects than plain water, at once appeals to one, for it is a question, which it is perfectly safe to say, must sooner or later be faced, and a remedy found for the present unpleasant conditions prevailing on all highways where there is heavy motor traffic. How to meet this charge, of course, raises a financial question that we are here not prepared to discuss, but without going into the argument that motor cars should be more substantially taxed than at present, it is fair to say that it would be perfectly equitable to ask the owners of motor cars, who use such frequented roads, as, for example, the Stillorgan-road from Donnybrook to Bray, to contribute something directly or indirectly to the considerable cost which the application of any remedy involves; nor do we believe they would seriously object. The nature of the contribution and mode of collection also requires consideration, possibly some increase in the cost of the license for motors might meet the case, as we are hardly likely to see the restoration of the old turnpike system.

Messrs. Brunner, Mond and Co., of Northwich, the world-renowned Alkali manufacturers, have kindly given us a few particulars of the cost and use of calcium chloride, which is sold at the rate of 30s. per ton at the works, and is made up in drums of about 5 cwt. each.

For the first treatment of 100 yards' length of road 6 cwt. of calcium chloride, costing 9s., will be required,

and for each subsequent treatment 3 cwt., costing 4s. 6d. and can be readily mixed in the watering carts, by breaking it up into lumps the size of a man's hand and putting it into the cart before adding the water. The solution should, of course, be well stirred.

Having gone so far as to adopt steam rolling for roads, it seems but logical to go a little further, and if it be at all financially practicable, to adopt some method of grappling with the dust difficulty. Mr. Brooke's experiments seem to prove not only that the use of calcium or chloride solution is not only far more effective than ordinary watering, but actually cheaper, and that being so it becomes entitled to serious consideration as a most suitable and economical method.

#### The Boycotting of Irish Engineers and Architects.

We are pleased to see that the Dublin Corporation have at last removed their boycott of Irish engineers, in appointing Mr. Francis Bergin, B.E., 36 Westmoreland-street, as expert to report upon the plans and specification which have been prepared by Mr. J. G. O'Sullivan, A.M.I.C.E., for the new reservoir, the completion of which will obviate a recurrence of the trouble of 1893.

The example of the Corporation might, with advantage, be followed by the authorities of the surrounding townships, most of whom, when they require the services of an expert, go to London, as the Corporation have done up to the present.

The Committee are at present engaged in carrying forward the construction of an additional storage reservoir at Roundwood. In consequence of the increased number of consumers, and the necessity of catering for the wants of ratepayers on the higher levels of the city, the Committee regard it as incumbent upon them to improve the pressure in these districts. With these objects in view, they have, at great expense, recently laid a second line of pipes practically the entire way from Callow Hill to the city.

The Belfast Corporation, in contrast to the Dublin Corporation and the townships, such as Rathmines, Pembroke, etc., have carried out some of the biggest and most successful schemes through local engineers and architects.

The great Mourne water supply, the city electric lighting, and the new technical schools may be instanced, and we have never heard it suggested that there is a narrower field of choice in Dublin than in Belfast.

#### The Design for Regent-street.

Mr. Norman Shaw's design for the reconstruction of the Regent-street Quadrant is regarded unfavourably by the tradesmen there, and a determined movement in opposition to the scheme has been set on foot.

A petition to the Commissioners of Woods and Forests has been drawn up, and already quite two dozen signatures, including those of some of the most prominent firms of Regent-street, have been affixed to it.

It is suggested that the style of architecture is much too elaborate and such as to be financially beyond the reach of the ordinary lessee. The heavy columns on the ground floor will take up too much of the shop window space and break the continuity of the window line, making it almost impossible for any one occupier to have a succession of shops.

The tradespeople ask that Mr. Norman Shaw's design may be reconsidered, and that a scheme more satisfactory to them may be substituted for it.

#### Visit of the Engineering and Scientific Association to Lucan.

On Saturday last, 9th inst., favoured by glorious weather, a party of the members of the Engineering and Scientific Association of Ireland, with a number of guests and lady friends, to the number of about fifty or sixty in all, paid an extremely pleasant visit to Lucan. Two special cars left Parkgate-street at two o'clock. A short stop was made at the Tram Company's power station before reaching Lucan. The visitors were received by Mr. Harrison, the company's engineer, who showed them over the interesting and up-to-date little power-house. The station, needless to say, is kept in the "pink of condition," and, picturesquely situated as it



is, constituted a most pleasant interlude by way of business before the more irresponsible part of the programme was reached.

Arrived at the Spa Hotel, afternoon tea having been partaken of in the pretty grounds of the hotel, the interval between this and "high tea" afforded time for a stroll through the demesne along the delightful banks of the Liffey. Several English visitors were loud in their praise of the Sylvan beauty of the scene.

After "high tea," or, more accurately, a substantial supper, partaken of in the open, some of the members and lady guests contributed a few songs, Mr. Howard Egan presiding at the pianoforte. Fittingly enough, the delightful evening wound up with a little impromptu dance. The kindly, good, genial president (Sir Charles Cameron, C.B.), as usual with everything he undertakes, doing his level best to make the time a pleasant one, and, we were all glad to see, footing it with the youngest and gayest of us, in the merry maze of the dance.

Before leaving Sir Charles conveyed the thanks of all to Miss Smith, the manageress of the hotel, for the admirable arrangements made for the comfort of the party.

Returning to town by a special car, at ten o'clock, we all felt under an obligation to those ever active and ideal hon. secretaries (Messrs. Purser and Boucher) for the delightful outing they had given us one and all.

#### Terenure Drainage Scheme.

The draft agreement with the Corporation of Dublin in the Terenure Sewerage Scheme, at the last meeting of the District Council, was considered and the following resolution was passed:—

That we, the South Dublin Rural District Council, approve of the draft agreement with the Corporation re the Terenure Sewerage Scheme, and that the whole Rural District be the area of charge for the cost of construction, and the Terenure area pay the cost of maintenance, as already agreed on in a previous resolution.

We hear certain extensive reconstruction of the electric lighting arrangements, gas plant, and printing power of the Bank of Ireland will shortly be begun; a London firm has been appointed consulting engineers for the work. The estimated outlay is £8,000.

The same consulting engineers have been, we understand, appointed by Messrs. Pim Brothers in connection with a similar scheme for their extensive premises in South Great George's-street.

The London Architectural Association have arranged their annual excursion to take place at Stamford from 13th to 18th August.

#### LAW.

##### BETTER THAN A "DOWSER" How to Find Brick Clay.

The compensation to be paid by the Rathdown No. 1 Rural District Council, who are about building 66 labourers' cottages in South County Dublin, to the Kill-o'-the-Grange Brick Company for half an acre of their lands, which the Council propose to acquire for the erection of a labourer's cottage formed the subject of an interesting discussion the other day before Mr. Robert Haire, M. Inst. C.E., Local Government Board arbitrator, who is sitting as arbitrator on this and other matters at Loughlinstown Union. The company's lands, 38 acres, are held under lease dated 25th March, 1835, for 1,000 years, at a rent of £82 5s. 3d., and were purchased by Mr. Bolton for £4,000 in 1887, when borings were made of the whole place. The claim made by the company through their chairman (Mr. Johnson, solicitor), and their valuer (Mr. James Adam) was that the Council should pay £234 for the half-acre. This calculation was based by Mr. Adam on the grounds that eight or ten feet under the soft soil there were 20 feet of pure brick clay, that the half-acre contained 24,000 cubic yards of such clay, which he reduced by half to 12,000 cubic yards, which was capable of making 4,800,000 bricks. Finished bricks produced an average price of 30s. a thousand, and he fixed the value of the clay at 1s. a 1,000, or £264. He had abated out of that 28 years' rent of the half-acre, at £1 1s. 6d. reducing it to £234.

To Mr. Shannon—He did not make excavations in the half-acre, but there was a hole there 8 feet deep, and the clay commenced at the bottom of it. He did not see the clay, but he knew it was there, as he had made previous valuations. The plot was situate 700 yards from where the works were proceeding, and there was no sandpit in its vicinity.

Mr. Shannon—Your evidence is the most interesting I ever heard. "Johnnies" go about with divining sticks looking for water, but you beat them all by finding clay without going near it.

Mr. Adam—If the stratum goes in the same line there should be 20 feet of clay.

Mr. Johnson said that previous borings showed there were 20 feet of clay in the lands.

To Mr. Shannon—The plot on which it is now proposed to erect the cottage is not the original site, but an alternative one given by me.

Mr. John J. Reilly, for the Council, valued the half-acre at £15 for the owner and £12 for the occupier. He did not believe it contained any clay. However, he valued it simply as agricultural land.

"What are your qualifications as a valuer?" asked Mr. Johnson. "The very best—practical experience," was the retort of Mr. Reilly.—*Freeman's Journal*.

**Dublin.**—**IVEAGH TRUST PUBLIC BATHS.**—These magnificent baths, which are situated in Bride-road, directly opposite Iveagh House, and within a stone's throw of St. Patrick's Cathedral, were opened to the public on the 6th inst. The main building, which is of red brick and sandstone, with artistic stone dressings, except the first storey, which is of cut granite, presents a most attractive appearance. Its length on the outside measures 176 feet, its width 53 feet, and height from the basement about 60 feet. It has a pitch-pine roof supported by steel principals, and its walls are embellished with white enamelled tiles, which lend an artistic tone to the entire surroundings, and produce a most agreeable effect upon the eye. The most important part of the building, which is expressly devoted to the pastime of swimming, measures 82½ by 48½ feet, while the pond itself, which is covered on the bottom and sides with white enamelled bricks, measures 65 feet by 30, and affords a depth of water to the swimmer from the safe 3 feet 6 inches for the novice at its shallowest end, to 6 feet at its deepest end for experts. Overhead there is a splendid glass roof, and a range of side windows for ventilating the building, and at the same time for lighting the swimming pond by day, whilst by night the entire premises are lighted by a series of handsome electric lamps. On the north and south sides of the pond are forty-seven dressing boxes for the use of bathers, and at the extreme northern end is the instructor's box. Inside the main entrance the office is located, where to the right and left respectively tickets of admission are issued to men, women and children. In addition to the swimming pond there are 16 hot and cold reclining baths for men, and nine for women, arranged on opposite sides of the building, running around which there is a fine ornamental gallery immediately over the pond, at the south end of which there is an ample supply of shower baths, foot-baths, lavatories, etc. There is an excellent wash-house at the south end lined with white enamelled tiles, and well equipped with washing, wringing, and mangling machines, together with a drying closet of new design for the sole use of the baths. In addition to the foregoing, there is a towel store, a workshop, and a number of lavatories for the use of the workmen who are engaged on the premises. The system of heating the swimming pond to the proper temperature is most effective. This is carried out by means of two twin-boilers constructed by Messrs. Rosser and Russell, of London. Adjoining the stoker's room is a chamber containing an enormous steam cylinder, from which large hot water pipes run round the sub-way and empty themselves into the swimming pond. Alongside these pipes are others of a similar size for carrying off the water that is used for washing the floors and dressing-boxes overhead. Every detail in connection with the baths has been carried out in a most elaborate and sumptuous manner, and no expense has been spared in making them one of the finest public institutions in the city. There is a residence on the premises for Mr. Dixon, the caretaker, who, up till recently, held the position of chief night attendant at Iveagh House, where he was most popular amongst the lodgers. The buildings reflect the greatest possible credit on the local engineers and architects, Messrs. Kaye-Parry and Ross, and the efficient manner in which the work has been carried out is highly creditable to the contractor, Mr. W. Beckett, of Percy-place.

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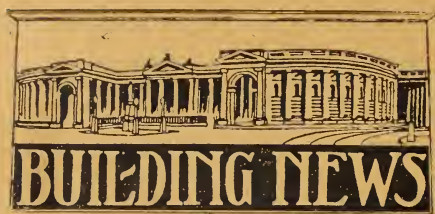
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**Athlone.**—The Urban District Council of Athlone invite tenders for the erection of a Market House at the Market Square, and also for the erection of a store at the Waterworks, according to the plans and specifications of their Surveyor, P. J. Prendergast, Esq., A.M.I.C.E., which can be seen at his office, Northgate-street. Tenders on the 20th inst.

**Burnfoot.**—Tenders for outside rough-dashing and inside plastering, and slating the teacher's residence at Burnfoot will be received by secretary, Mr. M'Caskie, Burnfoot.

**Bray.**—The Bray Urban District Council will on Tuesday, 19th June, receive tenders for erection of fifty-two workmen's cottages at Purcell's Fields, in accordance with plans, specifications, and conditions prepared by C. H. N. Sutter, Esq., C.E., surveyor and architect to the Council.

**Cork.**—Tenders have been received for the rebuilding of Nos. 2 and 3 Prince's-street, Cork, for Mrs. N. Bowdren. Plans and specification prepared by Samuel F. Hynes, F.R.I.B.A., 21 South Mall, Cork.

**Cork.**—Tenders are invited for rebuilding Nos. 2 and 3 Prince's-street, Cork, for Mrs. N. Bowdren. Plans and specification prepared by Samuel F. Hynes, F.R.I.B.A., 21 South Mall, Cork. Tenders with architect before 14th June.

**Cashel.**—The Cashel Urban District Council received tenders for the supply of about 393 yards of cast iron gas pipes, 3 inches in diameter, 9 feet long, by  $\frac{1}{2}$  inch thick, and about 375 yards of cast iron gas pipes, 2½ inches in diameter, 9 feet long by 5-16 inch thick. Also, one cross piece, 6 inch by 3 inch arms; two tee pieces, 3 inch by 1½ inch; and one square bend, 2½ inch.

**Cahir.**—New "HOME" FOR SOLDIERS AT CAHIR BARRACKS.—The building of a very spacious "Soldiers' Home" has just been completed at the eastern side of Cahir Military Barracks (at present occupied by three batteries of Royal Field Artillery). The new "Home," erected at a cost of between £2,000 and £3,000, for Miss Sandes, who has already provided similar institutions at various military stations throughout Ireland, is a most extensive and commodious building, got up in the latest style, and with all modern improvements, and comprises recreation and bath rooms, etc., with a very fine central hall, about 62 feet by 25, divided by a patent movable sliding partition into coffee and reading rooms, and available at its full size at any time that it may be required for lectures, etc. The architect for the works was Mr. J. Gardner, of Dublin, and the contractors, Messrs. T. Holloway & Sons, of Cahir, to whom, and to their foreman, Mr. John Keating, much credit is due for the highly satisfactory manner in which they were carried out. The plumbing and sanitary arrangements were done by Mr. Robert Costello, of Catherine-street, Waterford. We understand that Messrs. Holloway and Son are at present carrying out extensive alterations and improvements at Knocklofty House for Lord Donoughmore.

**Co. Dublin.**—The Rathdown No. 1 Rural District Council will, on 20th June, receive tenders for tiling of kitchen floors of twelve labourers' cottages—eight at Balally and four at Kingston—in accordance with specification prepared by R. M. Butler, Esq., C.E., M.R.I.A.I.

**Clontarf.**—Tenders are invited for the rebuilding of the Church and Schools, according to the drawings and specification prepared by Messrs. W. M. Mitchell and Sons, architects.

Clontarf Presbyterian Church.—Tenders have been invited for the contemplated additions and alterations to this church. The architects are Messrs. Millar and Symes, 60 Dawson-street, Dublin; bills of quantities by Mr. J. Graves Clayton, N.B. and M. Buildings, Nassau-street.

**NORTH DUBLIN RURAL DISTRICT COUNCIL.**—The North Dublin Rural District Council have made an Improvement Scheme in pursuance of the Labourers' (Ireland) Acts. The sections of the Rural District to which the scheme relates consist of the Electoral Divisions of Blancharistown, Howth, Coolock, Drumcondra Rural, and Finglas, and the estimated cost of the scheme is £12,800.

**Kilbride (Co. Meath).**—Tenders have been received for extensive repairs to Kilbride Church, Co. Meath, for the Very Rev. T. Casey, P.P., Churchtown, Navan, Co. Meath. William H. Byrne and Son, 20 Suffolk-street, Dublin, are the architects.

**Kildare.**—KILDARE BUILDING ACTION.—In the Nisi Prius Court, on Tuesday, before the Lord Chief Justice and a City Common Jury, the case of Carbery v. Heffernan was tried. The plaintiff was Daniel Carbery, carrying on business as D. and J. Carbery, and the action was brought to recover £250 from the defendant, John Heffernan, of Claregate-street, Kildare, alleged to have been due for work done and materials supplied in the building of a house in that town. A contract was entered into between the parties in July, 1902, that the plaintiff should build the house, according to the specification, for a sum of £420. The house was built, and an instalment of the price was paid, leaving due the balance now sued for. The defendant said that the house had not been built according to contract; that it should have been finished in March, 1903; that it was not yet finished; and that it was uninhabitable. The defendant counter-claimed £250 for delay. Messrs. H. Wilson, K.C.; Powell, K.C.; and Dudley White (instructed by Mr. Val. Kilbride) appeared for the plaintiff. Messrs. Healy, K.C., and James O'Connor (instructed by Messrs. Brown and M'Cann), appeared for the defendant. After the case had been at hearing for some time, a settlement was arrived at, the defendant agreeing to pay the plaintiff £200.

**Kilkenny.**—KILKENNY UNION.—The Board of Guardians of the above Union will, on 21st June, receive tenders for painting the porch of the fever hospital of the Kilkenny Union.

**Kilkenny.**—The Board of Guardians will, on 21st June, receive tenders for the re-ceiling of the Workhouse Roman Catholic Chapel.

**Letterkenny.**—Tenders were received for the erection of office building for J. M. Mayfield, Esq., Glenmaquin. The architect is Mr. John M. Intyre, Letterkenny.

**Limerick.**—The Munster Connacht Exhibition will be opened in Limerick in July next. The accepted designs, which are now being worked from, are those by Mr. Brian Sheehy, C.E. In addition to the pleasing design the facade will have the further attraction of being coloured. The work is being pushed on in a rapid manner; from early morning to nightfall steady progress is being made by the workmen employed in the erection of the buildings. The contractors, Messrs. Ryan and Sons, in the short space of six weeks, have done splendid work, the carpentering work being by this time almost finished with.

**Mallow.**—The Board of Guardians of Mallow Union received tenders for the following:—(1) improvement of Workhouse sewerage, (2) painting of Workhouse R.C. Church, (3) repairs to windows and washing utensils in laundry.

**Portadown.**—Tenders wanted for erection of a new shop and living quarters for the Misses Anderson, Mandeville-street, Portadown. Mr. Jackson, Armagh-road, is the architect.

**Stradbally.**—Tenders were received to build and enclose a new presbytery at Stradbally, within two miles of Castlegregory railway station, County Kerry.

**Co. Wexford.**—Tenders for the entire carpenter work of a new house—exclusive of windows and doors—will be received by Mr. Cresswell, Inch, from whom all particulars can be had. The lowest or any tender not necessarily accepted.

#### DEATH OF AN IRISH ARCHITECT IN AMERICA.

The death is reported from San Francisco of Mr. Bryan J. Clinch, architect. Deceased was son of the late Mr. Hugh O'Brennan Clinch, St. James's-terrace, Dolphin's Barn, and grandson of Councillor James B. Clinch, Eccles-street, Dublin. Deceased was a young man of much professional ability, and much sympathy is felt with his relatives in Dublin.

The roads at Epsom have been treated with improved Westrumite with the object of minimising the dust nuisance during the race week. Westrumite is manufactured by Messrs. Hope and Sons, 22 Billiter-street, E.C.

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# ENGINEERING SECTION.

## ITEMS.

We are informed that the Arterial Drainage Commission, having suspended session in Dublin, will, early in July, commence to hold local enquiries. The districts which it is proposed to visit will be those of Lough and River Erne, Lough and River Corrib, and River Barrow. It is not yet determined in what order the inspections will be made, so that exact dates cannot be fixed. The Secretary to the Commission has recently been visiting the districts making the necessary preparations.

A new explosive named ammonal, is at present being experimented with by leading engineers and contractors in Canada. As is well known, the majority of nitro-glycerine blasting explosives are liable to certain dangers; they freeze and have to be thawed, they explode on contact, or their fumes are noxious. The new explosive is not subject to temperatures, and can only be exploded by a detonator. Ammonal is a compound of aluminium, with nitrate of ammonia, and has enormous destructive effect when used for blasting purposes.

From time to time pessimistic reports about the decadence of the coal industry in the comparatively near future are revived. It is, therefore, satisfactory to hear that in Lancashire the reverse is the case, contracts having been recently placed for the opening of as many as fifty new mines. The estimated cost is considerably over five millions sterling, and fourteen thousand men will be given much-needed employment. Some of the shafts, in order to reach the deeper measures, will be sunk to a depth of two thousand three hundred feet, and the sinking will occupy from three to five years.

The dockyard at Devonport will, within a short time, have its new electrical installation in full working order, by means of which work will be carried on more rapidly and even more efficiently than at present. The scheme is a fairly large one, about sixty miles of heavy cable having been employed. In the generating station are seven sets of Babcock and Wilcox self-stoking boilers, connected with three Belliss engines of 1,000 h.p., and one of 500 h.p. Arrangements have been made for the provision of a fourth 1,000 h.p. engine when required. The yard lighting will be provided for by 160 ten ampere arc lamps on high standards, while for internal lighting there will be over 200 arc lamps and a large number of incandescents. At present there are about 200 motors in use, some up to 70 h.p., and this number will be increased to 400. The distribution is of 2,230 continuous current on a three-wire system, the wiring being run in steel tubes, and the switches and fuses steel-encased as a protection against fire.

It is barely a fortnight ago that the Greenwich Tramways Generating station of the London County Council was opened by the Chairman of that body, and a curious state of affairs has arisen which will be of interest to every scientist and of immense importance to those who go down to the sea in ships, and probably to the ratepayers of London. Although only a portion of the plant at the new works is in use, the effect of the engines upon the observatory at Greenwich is such as to so disturb the delicate mercurial instruments there installed, that they are rendered unreliable. The instruments chiefly affected are those for determining the longitude and the time at which stars pass the meridian. The work done at the observatory is, of course, one of international importance, and proper representations have been made to the London County Councils with reference to the disturbance caused. The Admiralty is also considering what steps can be taken to preserve the *status quo ante*. The L.C.C. officially declines to acknowledge any liability in the matter, and considers that the authorities of the observatory should have protested against the proposed erection of the power station half-a-mile away from the door when the scheme was first mooted. This attitude on the part of the Council can readily be appreciated when the magnitude of the new station is considered. It comprises an area of almost four acres, and will supply energy to the Council's tramways on both sides of the Thames. The structures consist of a boiler-house, engine-room, offices, sub-station, workshop, pump and strainer houses, an outside coal bunker, and a pier for unloading purposes. Twenty-four sterling water tube boilers, of the five-drum type, are installed in the boiler-house, each boiler being capable of evaporating 16,300 lbs. of water per hour at the working pressure of 200 lbs. per square inch. The type of steam generator is unique as far as Great Britain is concerned. The four units each consist of twin vertical horizontal Corless engines. Two complete compound engines, each

with a vertical h.p. cylinder, 33½ inches diameter, a horizontal l.p. cylinder, 66 inches diameter, and a stroke of four feet driving on to a common crankpin, are installed on either side of a 3,500, k.w. three-phase alternator working at 6,600 volts pressure and 25 cycles. The present building contains 14,000 k.w. of plant. The second portion, in which turbo-generators are to be used, will contain 20,000 k.w., making 34,000 k.w. for the completed station, which is estimated to cost nearly one million pounds. Having briefly outlined the finished and proposed scheme, it will be seen what interests are involved. On the one hand, a recently-opened generating station, equipped with modern plant, in which capital to the tune of £1,000,000 is sunk. On the other hand, there is the time-honoured institution, Greenwich Observatory, the officials of which already complain of the unreliability of their instruments, which will naturally become more apparent when the whole power plant is in operation. It will doubtless be a big fight between such important interests if the Council retains its present attitude, and although some methods might be adopted to reduce the vibrations by introducing turbines in lieu of the reciprocating engines, it is to be feared that the proximity of the power-station is such that the Observatory will always be materially affected. So the new science and the oldest of sciences are in handgrips.

At a recent meeting of the Cork Waterworks Committee an exhaustive report by Mr. J. F. Delany on the proposed auxiliary water supply from the Chetwynd district was read. The Corkonians have not yet forgotten the failure which occurred last summer, when, owing to the prolonged drought and the break-down of a great part of the pumping plant, the city narrowly escaped the discomfort and dangers of a water famine. Their representatives have since been leaving no stone unturned to prevent a future similar occurrence, and have under consideration the formation of an auxiliary supply both for the outlying districts and the lower portion of the city. The engineer, however, is of opinion that before incurring further expenditure the effect of the improvements already in hand should be noted. At Lee Road some £15,000 will have been laid out in installing a new plant, which is intended to render the population supplied absolutely immune to any further irregularities as far as shortage is concerned. It is also contemplated to carry out considerable improvements in the mains and fittings of the distribution system, and these works will involve an approximate expenditure of £10,000, for which sum application has already been made to the Local Government Board. After considerable discussion, the engineer's opinion was concurred in, and it was decided to await trial of the schemes in hand before embarking on further expenditure.

The launching of the new Cunarder, the Lusitania, on June 7th, may be considered to be the inauguration of a new type of mercantile marine. In size, tonnage, speed and methods of propulsion the new ship outstrips any of her predecessors, and it is to be hoped that the honour of holding the finest steamship afloat will now long remain with Great Britain, after having, for many years, been wrested from her by Germany with the Kaiser Wilhelm II. The length of the Lusitania is 785 feet over all, breadth 88 feet, displacement 38,000 tons, gross tonnage 32,500 tons, draft 33 feet, and i.h.p. 68,000. The length of the Kaiser Wilhelm II. is 706 feet, breadth 72 feet, displacement 26,000 tons, gross tonnage 20,000 tons, and i.h.p. 40,000. A comparison of these figures clearly shows how far the new addition to the merchant service outdistances her nearest rival, but the chief point of interest is centred in her engines which are designed far in advance of any previous practice. The cruiser Amethyst, the Victorian of the Allan Line, and the Carmania of the Cunard Line were being fitted with turbines when the new Cunarder was being planned, and it was decided, in order to obtain a minimum speed of 25 knots per hour that turbines of five times the power of those of which knowledge could be obtained, should be installed, and this decision was arrived at after various experiments based upon admiralty methods. The Lusitania will have four propelling turbines, each working its own shaft and three-bladed propeller, and two reversing turbines. By thus increasing the number of turbines the power is more evenly distributed, and they can be separated in water-tight compartments with obvious advantage. As this increase in power is so enormous and the estimated speed is based on vessels that bear but little comparison with the new one, the Lusitania, when fully equipped for her maiden voyage may hold many surprises. At all events, she is expected to reduce the duration of the trip to Sandy Hook to four and a-half days. And, there are many



people living to-day who were more than boys and girls, when the *Serius* started from London on April 4th, 1838, and arrived in New York on the 22nd, after a voyage of 17 days. We do not intend to reiterate the details of the construction of the new ocean liner, which have appeared fully in the daily Press, but it is a great source of satisfaction to the people of those islands, that Great Britain's reply to the now moribund Morgan combine, which was to sweep the seas, is the finest and most powerful vessel afloat, a useful national asset in time of peace, and when armed with her twelve six-inch guns, a formidable opponent to an enemy in time of war.

The Germans recognise to the full the economic value of inland waterways, and are busily constructing canals through the length and breadth of their country. The latest to be completed is the Tolkow Canal, connecting the River Havel on the west of Berlin to the Upper Spre on the east. The canal is 24 miles long, of a minimum width of 65 feet and 8 feet in depth in the centre, permitting the passage of vessels of 600 tons with a 5 ft. 9 in. draught. The dimensions are uniform with those of the other German canals already completed or in course of construction. The 9 feet difference in level between the two rivers has been met by the construction of a double lock, in which an ingenious arrangement of sluices allows the operation of locking to be performed, when two vessels are passing one another, with half the usual quantity of water. Electric traction will be utilised, the current being obtained from overhead cables, and the towage will be performed solely by the District Council. The return thus obtained will recoup the Council for its capital outlay on the scheme, about £2,000,000. Over sixty bridges, including eight railway bridges, had to be constructed, and forty-two new roads laid down. This thorough method of dealing with inland navigation will probably be considered by the Canals and Waterways Commission, now sitting. So far, nothing of extraordinary interest in the way of evidence has been taken, but the views of the several witnesses examined have generally been in the direction popularly expected, that the closing of canals by the railway companies had been detrimental to public interest.

## IMPORTS.

### PORT OF DUBLIN.

May 30th, per *Spencer*, from Chester, 130 tons brick goods, J. Kelly and Son.

May 31st, per *Bangor*, from Middlesboro', 330 tons cement, J. P. Corry and Co.; per *Lady Wolseley*, from London, 1,789 sacks cement, T. Dockrell, Son and Co., Ltd.; 200 sacks whitening, T. Dockrell, Son and Co., Ltd.; 440 sacks cement, J. M'Ferran and Co.

June 5th, per *Penrhyn*, from Rochester, 340 tons cement, T. and C. Martin, Ltd.; per *Yews*, from London, 360 tons cement, T. and C. Martin, Ltd.

June 6th, per *Lord Londonderry*, from Baltimore, 599 pieces oak lumber, 104 logs hickory, 67 tons roofing slates, 126 bundles 503 pieces pine, to order; per *Eldir*, from Newcastle-on-Tyne, 400 tons cement, Johnson and Co.; per *Jessie Sinclair*, from Paisley, 140 tons bricks, R. Brown and Son; per *Fame*, from Bridgewater, 100 tons bricks, J. Kelly and Son.

June 7th, per *Munter*, from Fredrikstad, 77,597 pieces flooring boards, W. and L. Crowe, Ltd.; 10,226 pieces scantling, W. and L. Crowe, Ltd.; per *Winga*, from Goteborg, 6 cases glass, 272 pieces deals, to order.

June 9th, per *Bay Head*, from Montreal and Quebec, 123 pieces birch, 74,948 pieces deals, 54 pieces oak, 170 standards firewood sawn, to order; per *Lady Hudson-Kinahan*, from London, 1,000 sacks cement, T. Dockrell, Son and Co., Ltd.; 700 sacks cement, T. Archer; per *Lady Martin*, from London, 440 sacks cement, J. M'Ferran and Co.; 62 packages lead, T. Dockrell, Son and Co., Ltd.

June 11th, per *Galtee*, from Ghent, 7,046 bags cement, 590 bags nails, 8 cases marble, to order; per *John Bull*, from Wokington, 200 tons cement, A. Agnew; per *Ellie Park*, from Belfast, 155 tons bricks, H. and J. Martin, Ltd.

June 12th, per *Teewyn*, from London, 85 tons Jarrah planks, Dublin Port and Docks Board; per *Witch*, from Glasgow, 25 tons fireclay goods, 25 tons fireclay, 10 tons cement, T. Archer; per *General Lee*, from Belfast, 250 tons bricks, H. and J. Martin, Ltd.

## PHOTO-PRINTS BY ELECTRIC LIGHT.

Architects and Engineers who want good copies, quickly done, should send a post card to J. Lindsay, 17 Westland row, Dublin, or Telephone 2278. City orders called for. Prompt attention to country orders. Tracings neatly made. Photo-papers stocked.

## THE PULSOMETER ENGINEERING COMPANY. Feed Pumps.

The Pulsometer Engineering Company, Limited, of Nine Elms Works, Reading, and 61 and 62 Queen Victoria-street, London, E.C., send us a copy of their "Karoom" high economy feed pumps, for the manufacture of which they have established a high reputation. The company claim for their pumps several notable advantages, amongst which may be mentioned high economy in steam consumption, simplicity of design and smooth working, first-class workmanship and materials, absence of fly-wheels or gearing, large water ways, and that they are eminently suitable for power-house requirements.

The catalogue before us is most attractively got up, and nicely illustrated with quite a large variety of these simple and compound feed pumping engines, together with the fullest tabular specification of the working and capacity of each variety illustrated. We take from the information supplied to us the following general description of a "Karoom" feed pumping engine:—

"The pump is of the direct acting vertical type, with high and low pressure steam cylinders coupled to double acting pump. The high pressure cylinder is fitted with piston valve and the low pressure cylinder with flat side valve. The high pressure piston valve also serves as the shuttle valve, and is operated by an auxiliary or pilot valve, worked by a lever and tappet rod.

"All material and workmanship are of the very best description. All parts are made to gauge and strictly interchangeable. All bolts and studs are truly turned and screwed to Whitworth Standard Threads. All steel nuts are case-hardened. A distance piece is fitted between the high pressure and low pressure cylinders with a stuffing box for each cylinder, by which device the glands can be easily re-packed and the waste occasioned by an unseen leak through an intermediate gland is avoided. The cylinders are carried from the pump by three stiff steel columns. The low pressure piston has two rods, thus enabling a good connection to be made between the crosshead, the pump rod, and the piston rods, and to allow of easy overhauling. The pump has its valve-boxes so arranged at the top of the barrel that there is no possibility of an air trap. The pump valves and seats are easily accessible and taken adrift and are of the group type of small diameter and small lift. All water valves are of one size for all sizes of pumps. All steam and water inlets and outlets are arranged for flanged connections, and all piston and pump rods and gland studs have split pins fitted."

The whole of the work is most accurately fitted, and from our perusal of the specification we should say that every valve and bearing is of the highest class of workmanship; as well as being thoroughly well thought out.

Amongst the types illustrated may be mentioned "Mark III," with an illustration showing it fitted up in an electric supply works.

Another type is used on the battleships and cruisers of the British Navy. On the battleships are also used oil fuel pumps of this make, as illustrated in the catalogue.

There are several other illustrations showing the larger types of circulating pumps at a big London generating station.

The catalogue includes some useful information on "spare gear," enabling customers to readily order spare parts, or to replace them when worn out. A few words are added on tests, and comparative results given.

The Pulsometer Company declare their readiness to replace any parts which are shown to have been in any way defective, if returned to them within six months of date of delivery.

Engineers engaged on the design of machinery for power-houses and in specifying feed pumps, would do well to obtain a catalogue and get into touch with the Pulsometer Company before finally deciding upon the make of pump to be used.

Messrs. R. S. Clare and Co., Limited, of Liverpool, have received an order for "Dustroyd" from the Borough of Hertford.

According to the latest advices from the West Coast of America the San Francisco fire will not have as marked an effect on the prices of timber as was expected on this side. It appears that the destruction of wood stocks in the city caused by the fire was small, and it is not by any means certain that the consumption of timber during the rebuilding will be greater than it was before the fire. Moreover, San Francisco, after all, represents only a small portion of California and the rest of the West Coast, where the growth of other towns and cities has been and is phenomenal. While on this subject we may remark that the United States Congress has suspended the import duties on structural steel, timber, and other building materials brought into San Francisco during the next twelve months.

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Supplement To "The Irish Builder and Engineer," June 16th, 1906.







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## REVIEWS OF CATALOGUES.

**Messrs. Reyard Bros.,** 81 Queen Victoria Street, London, E.C., send us their price list of the "Reyard" Time and Labour Saving Office Appliances. These include a number of letter copying devices, duplicators, carbon papers, and copying books, all of which are catalogued at very reasonable prices. A speciality of this firm are their Card Index Cabinets and Box Files, which are very ingeniously arranged. Perforating presses, cheque punches, copying presses, fountain ruling pens, and a variety of other useful office requisites are illustrated. This catalogue will be found a useful book of reference.

**The Trussed Concrete Steel Co.** 11 Tothill Street, Westminster, London, submit their booklet descriptive of the Kahn system of Reinforced Concrete. Though dealing with a special system, this book will be found of great interest by all who desire to keep themselves thoroughly acquainted with the latest developments of this newest method of building construction. The book is profusely illustrated, showing the application of the Kahn system to every variety of structure, including bridges, warehouses, hotels, churches, residences, factories, railway termini, reservoirs, sewers, water conduits, etc. The principal feature of this system is the Kahn Trussed Bar, which is claimed to be the only reinforcing bar in which both the shear and tension members are combined in one piece. This leads to considerable saving in cost of erection alone, as there is no need to depend upon the proper placing of innumerable small members by careless workmen. It is impossible, in the space at our command, to describe fully the methods of the Kahn system, or to analyse the principles on which it is founded. We must, therefore, refer our readers to the pamphlet on the subject, which will repay study, and can be had on application to the above address.

**Messrs. F. W. Barker and Co.,** Ventilating Engineers, 199 Westminster Bridge Road, London, S.E., publish an interesting catalogue and a series of leaflets dealing with their ventilating specialities. Chief amongst these is Barker's newest patent automatic "Air Extractor" Ventilator, of which we give two illustrations showing the ver-



tical section and plan. The interior consists of an inner shaft U, surrounded by four extracting chambers E, each having an exhaust opening from top to bottom, arranged and constructed in a special manner, and facing four curved outer plates forming exterior of ventilator. Wind or air currents enter the outer openings W, and are impelled through the passages and across the openings of the extracting chambers E. The gradual narrowing of the passages and the consequent intensifying compression of the air current greatly increase its speed and power, so as to cause a most powerful suction upon the extracting chambers. These are closed across bottom by base plates, their upper ends opening into the large air chamber A, in roof of ventilator, from which they draw downwards the vitiated air, which is drawn up from the building below through the inner shaft U. It is claimed for this ventilator that the provision of the air reservoir A within the cap, and the fact of the central shaft U only terminating high up near the level of the top of extracting openings render the latter perfectly proof against the entry of water, which to enter the shaft U communicating with the building would have to rise to the level of the top of this shaft—a manifest impossibility. The entry of rain or snow is thus entirely prevented, and the ventilator is, therefore, not merely weatherproof, but impervious to dust and also sparks. The material from which the ventilators are made are best quality rolled annealed sheets of stout gauge, galvanised, rivetted and soldered. In the catalogue a great variety of designs of the ventilators are shown, suited to different styles of architecture, some of them being exceedingly handsome. A number of other ventilating appliances are shown, including air bricks, gratings, ceiling outlets, air inlets for soil pipes, and sewers, louver ventilators, etc. Full particulars and designs and schemes for any building may be obtained free of cost from above address.

**Messrs. Adamez, Ltd.,** Old Queen Street, Westminster, London, forward their illustrated pamphlet descriptive of Adams' Patent Swing Lavatory over concealed closet set and over bath. As applied to a closet, this patent arrangement of lavatory basin is very ingenious, and makes for the great utility and economy. The lavatory is held to the wall by a swing bracket, which enables it to be turned either over or away from the closet. The waste discharges directly into the closet, abolishing the separate lavatory connection hitherto necessary. A similar arrangement is provided for in the shape of bath and combined lavatory, by which the same feed supplies both bath and lavatory, and the lavatory discharges its waste into the bath. The Adams' patents combine, as we have already said, ingenuity, neatness and utility, and we would recommend our readers to apply for catalogue, which can be had on application.

**Messrs. F. W. Reynolds and Co.,** the well-known saw-mill engineers, of Edward Street, Blackfriars Road, London, S.E., forward us their special list of second-hand and unlisted wood-working machinery, machine tools, etc., which they have ready for delivery. This firm does not usually purchase second-hand machines, and those mentioned in the list have either been taken in exchange or returned from hire. Amongst the machines listed are planing and moulding, morticing and tenoning machines, saw-benches, saws, engines, mortar-mills, lifting tackle, lathes, also iron planers, and milling and drilling machines, and a variety of miscellaneous machines for wood-working and other purposes. All these machines, though not new, are in first-class working order, and thoroughly overhauled, so that those in want of machinery have an opportunity of acquiring exceptionally good value. The catalogue is obtainable on application.

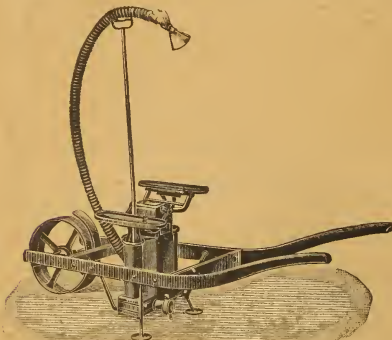
**Messrs. Edward Le Bas and Co.,** Dock House, Billiter Street, London, E.C., send a catalogue illustrating the manufactures of the George Fischer Steel and Iron Works of Schaffhausen, Switzerland, and Singen, Germany, of which Messrs. Le Bas are sole agents for Great Britain and the Colonies. Messrs. Fischer have been established for 100 years, and have over 50 years' experience in the manufacture of original Swiss malleable iron beaded tube fittings. They employ at their works close upon 2,000 men, and their manufactory, besides being the oldest, is the most important of all Continental fitting manufactories, their brand, +GF+, enjoying a unique reputation. These fittings are used for gas and cold water conduits, as well as for hot air and steam and for various industrial purposes, such as compressed air, etc., and are supplied in black and galvanised. A great variety of miscellaneous iron articles are also illustrated in this catalogue, which is too extensive for detailed notice.

Another catalogue issued by Messrs. Le Bas deals with the "Perfeta" double-acting Piston Pump, introduced to supersede Wing or Disc pumps, which sometimes wear out quickly when grit or foreign substances get between their wings or cylinders. The "Perfeta" pump has a single cylinder with a double-acting suction and forcing plunger, possessing when in motion a very short stroke, and thereby reducing the wear. All working parts are subject to the smallest possible action, and can readily be disconnected without difficulty. The pump is supplied in a variety of forms for different purposes, and for working either by hand or power. Our readers are referred for further particulars to the catalogue.

**The Sanitary Appliances Syndicate, Ltd.,** 68 Victoria Street, Westminster, London, S.W., send descriptive and illustrated particulars of Grundy's Patent, "The Only" Silent Flushing Closet Apparatus and Non-ball Valve Water Waste Preventive. This invention embodies several ingenious principles, and is radically different in action from the usual syphon and ball valve cistern. In the first place it is silent, which is no small advantage. In the second place the cistern and valve remain empty and free from wear and pressure until the closet is being used, and finally there is no syphon, and instead of availing of a vacuum to obtain sufficient force for the discharge, the very opposite action, namely, compressed air is used for the purpose. The principles underlying this action are very simple, being briefly as follows:—When the closet is being used, the valve opens and water enters the cistern from below, driving three-fifths of the air out, and compressing the remaining two-fifths in the cistern until the pressure is equal to that of the service. When the flush is started, this compressed air drives out the water with great force, and at the same time a valve in the top of the cistern opens automatically, admitting air, by which the full force of the flush is continued to the finish. The air valve then closes automatically. The closet can be flushed twice every minute. Owing to the method of working this system, height is not required, and the cistern stands only 3 feet 9 inches from the floor to the top. Ball valves are not required. There can be no overflow and no waste of water. The apparatus has been under the most severe tests for the past four years, and has been adapted by several Government departments, public bodies, school boards, railway companies, hotels, and large institutions in England as well as, of course, private dwellings.



Richard Anker, 106-108 Queen Victoria Street, London, E.C., sends us some interesting particulars of his Patent Pedal Pumps, of which we give two illustrations, one showing a simple form of the pump, and the other the pump in use. It will be observed that the pump is double acting, and is worked by pedals, full use being made of the power and weight of the operator. The muscles of the legs being



accustomed to more constant and much harder work than those of the arms, are, therefore, more fully developed, and when to this is added the weight of the body, which in this pump is utilised, it will be at once seen that great advantages are secured. It is, in fact, claimed, and with reason, that the capacity of this pump is three times greater than that of hand pumps, with a similar expenditure of energy. The action is similar to the working of a



bicycle, and thus even ladies and boys are able to work the machine for hours without getting fatigued. In construction, the "Anker" Pedal Pump is simple, being cast in one piece. It is also light in weight, compact, and easily portable. The water is thrown in a large volume, and the flow is continuous and regular. For its capacity the pump is wonderfully cheap, as the parts are few and simple.

Amongst the firms in Dublin, which are largely and firmly established in the engineering business, none is better known than that of Messrs. Tuck and Co., Ltd., Lower Abbey Street, Dublin, who are Admiralty contractors, and providers of engineers' tools and stores of every description. Amongst the specialities of Messrs. Tuck is one to which they devote particular attention, namely, the manufacture of wrought-iron split pulleys. We have before us a photograph representing one order

from a leading Irish firm for 67 of these pulleys, secured by Messrs. Tuck in competition. They cover a great variety of sizes, were all specially made to specification, and were delivered and erected within three weeks, a feat of which Messrs. Tuck may be justly proud. This firm is one employing a good deal of local labour, and, as such, deserves every encouragement. They are prepared to quote for iron or wood pulleys, shafting, mill gearing, belting, and all similar goods.

"Leading Lines" is the title of a catalogue issued to the building trade by Messrs. Young and Marten, Ltd., Caledonian Works, Stratford, London, E. Messrs. Young and Marten deal in practically every article required by the building trade, and it would be impossible to embody in this catalogue, or, indeed, in their more comprehensive publications, particulars of all their goods. The various designs shown in this issue of "Leading Lines" can only be taken as representative of other grades illustrated in their more comprehensive catalogues, described upon page 3 of cover of "Leading Lines." The No. 28 Illustrated Trade Catalogue will be forwarded with the first order received of the value of 20s. net, and when a supplementary order for goods to the net value of £5 is received, Messrs. Young and Marten will consign with same a set of their complete General Illustrated Trade Catalogue, in two volumes, bound in cloth, 880 pages, 12in. by 10in. These volumes cost £3,500 to produce. With regard to "Leading Lines," it contains prices and illustrations of a tremendous variety of articles required by the building trade, and we would strongly recommend our readers to apply for it in order to get some idea of the extent of Messrs. Young and Marten's trade, and the low prices at which they are prepared to work.

#### ROYAL INSTITUTE OF ARCHITECTS.

A special general meeting of the Royal Institute of the Architects of Ireland was held at the Institute Rooms, 20 Lincoln-place. The president, Mr. W. M. Mitchell, R.H.A., occupied the chair. There were also present:—Messrs. C. H. Ashworth, James H. Webb, H. Alberry, R. Stirling, G. F. Beckett, C. H. Mitchell, Frederick Hayes, George L. O'Connor, James Louis Donnelly, R. M. Butler, W. Kaye Parry, F. Shaw, Frederick Batchelor, Sir Thomas Drew, Frederick G. Hicks, Edwin Bradbury, and C. A. Owen, acting hon. sec. Mr. J. M. Mitchell and Mr. F. H. Tallon were admitted as members, and Messrs. C. H. Ashworth, Frederick Batchelor, Vincent Craig, Robert Cochrane, F. G. Hicks, A. Hill, W. H. Hill, R. Caulfield Orpen, C. A. Owen, George P. Sheridan, and W. J. Fennell received the honour of Fellowship. The question of increasing the subscription was considered at some length. The meeting decided on the proposal of Sir Thomas Drew, seconded by Mr. C. A. Owen, to officially adopt the amended conditions of building contract, as recommended by the Council, after having had the matter under consideration for a long period, and submitting same to counsel. Mr. Ashworth called attention to some objectionable features in the Bill lately introduced into the House of Commons by Mr. Bryce, and the matter was referred to the Council to take action thereon.

The Westminster Patent Flooring Co., Heckfield-place, Walham Green, London, S.W., have introduced a new invention named Parquetine, which is claimed to effect a revolution in floor covering. From time to time many attempts have been made to provide an artistic and effective substitute for linoleum, felt, and matting for rooms, halls, and surrounds to carpets. The highest effect is, of course, obtained by a permanent parquet floor, but the trouble and expense of laying this is prohibitive in the majority of cases. The idea of Parquetine is to provide a floor covering exactly resembling parquet in appearance, and which can be either permanently or temporarily fixed to the floor. It is made in a variety of different designs from the best quality figured oak and American walnut, and is immensely superior in appearance to linoleum, without being dearer. It is made in sheets, and sent out ready for laying, planed and waxed. It is fixed to the floor with special rustless pins, can be laid by any joiner or handy man, and removed by tenant when leaving and relaid in new premises. Parquetine is specially designed for surrounds to carpets, the edges being no thicker than oilcloth. The surface is non-absorbent and sanitary, and can be highly polished. Printed instructions are sent with each consignment. The Westminster Patent Flooring Co. also made a portable parquet for temporary use for ballrooms, marquees, portable buildings, etc. This is made in large panels, and can be easily laid and taken up without nailing or fixing.

## ENGINEERING NEWS.

**Ballyborough.**—The District Council of above District will, on Monday, 18th June, receive proposals from plumbers for making a specification for erecting a pump in the town of Shercock.

**Donaghadee.**—Some time ago the Urban Council of Donaghadee advertised for engineers to design and carry out a scheme of water supply and sewerage for the town. In reply to this, some 20 applications came in, which the Council gradually thinned down to two—that of Mr. H. J. Weaver, of Gloucester, who was prepared to undertake the work at 2½ per cent. on the cost; and that of Messrs. Swiney and Crossdale, M.M. Inst. C.E., of Belfast, who offered at their usual terms of 5 per cent. on the outlay. At a recent meeting of the Council the former gentleman was appointed, several members of the Council refusing to vote.

**Co. Dublin.**—The Rural District Council of Celbridge No. 2 received tenders for the sinking and walling of a pump well and the erection of a pump at Brownsbarrow, Co. Dublin, in accordance with specification prepared by J. J. Inglis, Esq., C.E.

**Killarney.**—The Council of the Killarney Rural District will to-day, 16th June, receive tenders for the erection of pumps at Gurrane and Tullibeg.

**Limavady.**—PROPOSED RE-BUILDING OF LIMAVADY RAILWAY STATION.—Mr. B. D. Wyse, C.E., chief engineer, Mr. C. F. Crofts, C.E., and other officials of the Midland Railway (N.C.C.) travelled to Limavady by special train in connection with the projected improvements to the railway premises at the passenger platform, which for a long time has been in a rather dilapidated condition. The company have had the matter under consideration for some time, and have now decided to start at once with the re-building of the station premises. This will be carried out on a very elaborate scale, as indicated by the already prepared plans and specifications. The new buildings will extend back over the present entrance to the stationmaster's house, and will include large and more accommodating waiting rooms and offices, with all the latest sanitary improvements. A grand entrance to the platform is sketched, and a barrier will also be put up. The company have also in contemplation necessary improvements to the goods platform, which is at present totally inadequate to meet the requirements.

**Lucan.**—The Rural District Council of Celbridge No. 2 received tenders for the construction of septic tanks, and other sewerage disposal works, at St. Edmundsbury Demesne, Lucan, in accordance with plans and specification prepared by J. J. Inglis, Esq., C.E.

**Midleton.**—The Midleton Urban District Council will, on 29th June, consider tenders for certain extensions and improvements to the existing water supply of the Urban District, including the construction of a town reservoir.

**Sandycove.**—PROPOSED SEA RAMPART AT BATHING PLACE, SANDYCOVE.—It is announced by the Board of Trade Harbour Department that an application has been received by them from the Kingstown Urban District Council for permission to construct a solid stone rampart, about 120 feet in length, upon the foreshore immediately in front of the baths at Sandycove, Dalkey, Kingstown. The proposed rampart will run nearly parallel to and at a distance of about 96 feet from the face of the sea wall in front of Sandycove Baths, and the top of the rampart will be about 3 feet 6 inches below high-water level of spring tides. The rampart is to be constructed for the purpose of retaining sea water during a portion of the ebb tide.

**Sligo.**—APPOINTMENT OF COUNTY SURVEYOR.—For the position of County Surveyor for the Sligo County Council, at a salary of £400 annually and office expenses, there were 19 applications, as follows:—Messrs. J. H. Barrie, Monaghan; W. A. Clarke, Merrion-square, Dublin; Robert J. Kerwin, Claremorris; Thomas T. Hamilton, Omagh; Alex. J. Agnew, Foxford, Co. Mayo; James Hardiman, Ballinasloe; T. Fendergast, Athlone; R. J. Sullivan, Castlerose; J. W. C. Lyons, Dundalk; E. A. Prior, Exminster; J. S. M'Loughlin, Donegal; John Mounie, Omagh; S. O'Dea, Cork; P. M. McCarthy, Westmoreland-street, Dublin; David M'Kinley, Cashel; William Cullen, Assistant Co. Surveyor, Dublin. Mr. Flanagan said he had received a telegram from a Sligo man named Francis Burns, who was at present in London, asking him to tender in his name for the situation. The Secretary said, provided Mr. Burns sent in his qualifications before Tuesday next, they would be forwarded to the Local Government Board, and his application would be considered with the rest. Mr. Cawley remarked that, no matter who they appointed, he must be as respectable and good-looking a man as their late County Surveyor. (Laughter.) The applications were forwarded to the Local Government Board.

**Tramore.**—PUBLIC HEALTH COMMITTEE.—The Waterworks Committee received tenders for supplying and erecting an oil engine and pumps, and suction gas plant and pumps, at the hilly beds, Tramore.

**Valencia.**—Tenders will be received up to the 30th June for the construction of an extension to the existing Board Pier at Glenleam, Valencia Island. Plans and specification can be inspected at the office of Mr. Hickson, C.E., Tralee.

## TENDERS.

**Cookstown.**—Building of 31 labourers' houses, in 11 single house and 10 double house blocks, for Cookstown Rural District Council. Mr. Henry Shillington, M.A., M.E., architect, Lurgan. Mr. Henry Alfred Mani, clerk to the Council. Accepted tenders (single houses):—Sam Cummings, Cookstown, £183; M'Kee and M'Nally, Cookstown, £179; Sam Cummings, Cookstown, £176; Hugh Thompson, Cookstown, £172; Sam Cummings, Cookstown, £169; John Forrest, Cookstown (2), £167 10s.; Hugh Thompson, Cookstown, £166; Cummings and M'Keown, Cookstown, £164; John Forrest, Cookstown, £161; Robert Black, Cookstown, £141. Tenders accepted for 10 double houses:—M'Kee and M'Nally, Cookstown, £346; M'Kee and M'Nally, Cookstown (2), £337; John Forrest, Cookstown, £335; John Cummings, Cookstown, £334; John Cummings, Cookstown, £323; Robert Black, Cookstown, £297; M'Kee and M'Nally, Cookstown, £293; Hugh Thompson, Cookstown, £284; Hugh Thompson, Cookstown, £279.

## CONTRACTS.

## URBAN DISTRICT OF BRAY.

## WORKMEN'S DWELLINGS.

## TO CONTRACTORS.

Notice is hereby given that the Bray Urban District Council will, at their meeting to be held at 10 a.m. on Tuesday, 19th June, 1906, be prepared to receive and consider Tenders for

Erection of Fifty-two Workmen's Cottages at Purcell's Fields,

in accordance with plans, specifications, and conditions prepared by C. H. N. Sutter, Esq., C.E., Surveyor and Architect to the Council. Plans, etc., may be inspected at the Town Hall between the hours of 10 a.m. and 4 p.m. Intending Contractors will be required to deposit a sum of £1 is. with undersigned for Form of Tender and copy of Bill of Quantities, prepared by James Haveron, Esq., C.E., 28 York-street, Dublin, which deposit will be refunded on receipt of a bona fide Tender. The Council will require two solvent sureties for the due performance of the Contract.

The Council is not necessarily bound to accept the lowest or any tender.

By order,

P. MACDONNELL,  
Clerk to the Council.

Town Hall, Bray, 1st June, 1906.

## NEW METHODIST CHURCH, CLONTARE.

## TO BUILDERS.

Tenders are invited for the Re-building of the Church and Schools, according to the drawings and specification prepared by Messrs. W. M. Mitchell and Sons, Architects, 10 St. Stephen's Green, N., where they can be seen. Bills of quantities can be obtained from the Surveyors, Messrs. Mumby and O'Rourke, 15 College Green, on payment of a deposit of £2 2s., which will be returned on the production of a bona fide tender.

Tenders to be sent in to the Architects on or before Wednesday, the 20th instant. The lowest or any tender not necessarily accepted.

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A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,  
(ARTS AND HANDICRAFTS.)

Every Second Saturday.

[Estab. Jan. 1859.]

No. 13—Vol. XLVIII.

HEAD OFFICE

JUNE 30, 1906.

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DUBLIN

Price 1d

## TOPICAL TOUCHES.

We are glad to see some slight signs of improvement in the state of the building trade in Dublin which, perhaps, warrants the hope that the worst part of the storm of depression that has prevailed during the past two or three years has been weathered.

Several contracts or projects which, although not of enormous extent, are yet sufficiently large to be hopeful indications. Amongst these are the completion of the North William-street Church, in reference to which the late Father O'Malley became involved in the sensational lawsuit tried a couple of years ago. Messrs. Byrne and Son are the architects, and Mr. James Kiernan has secured the contract at about £13,000. Mr. C. H. Ashworth is about to build a large new bakery in Patrick-street for Messrs. Kennedy, and some extensive works are offered for tender at the Dominican Convent, Eccles-street, Dublin.

In Grafton-street, on the Corporation Estate, some much-needed rebuilding will take place. Mr. L. A. McDonnell has prepared designs for rebuilding four or five houses between Chatham-street and Harry-street, lately occupied by the Singer Company, Mr. Geach, and others. The work of demolition has begun.

A new National Bank at Arran-quay, for which Mr. J. F. Fuller is architect, has been begun by Messrs. J. Donovan and Son.

Mr. J. C. Wilmott has completed designs for Northern Banks in Bray and Amiens-street, Dublin.

Messrs. Coniffe and Dillon have started a contract of some importance at one of the Kingstown convents, for which Mr. F. J. Bergin is architect.

Messrs. Ashlin and Coleman have prepared designs for important additions to Queenstown Cathedral and Holy Trinity Church, Cork.

A new building estate is being opened up near Cooper-road, Rathmines, at the Milltown end. Work is still going on in the North Circular-road vicinity.

On the other hand, building has, for the present at least, come practically to a standstill at Greystones and Foxrock.

Several other contracts, which do not occur to us at the moment, have been either entered into or lately projected, so that prospects are somewhat brighter than they were a few months ago.

In addition to the foregoing works, the Corporation will shortly offer for tender the Clontarf drainage works, which are estimated to cost over £50,000. For a good while past the plans have been in course of preparation in the offices of the Corporation, Mr. M. J. Buckley being the responsible engineer, with a staff of draftsmen under him, Mr. Chatterton, of London, being the consulting engineer.

Another work of some considerable importance is the Terenure drainage, which may at any time be ready for tendering, although there is still some hitch as to the volumes of sewage to be received into the Corporation sewer at New-street, and the limit after reaching which a separate sewer must be made to Wood-quay. The plans have been prepared by Mr. T. J. Byrne, engineer to the South Dublin District Council, Mr. Chatterton also acting as consulting engineer.

Mr. Edmund Sharp, the well-known Dublin sculptor, has secured the contract for the High Altar to be erected in the Church of SS. Augustine and John, Thomas-street, Dublin. This altar, which will be entirely of marble, is of considerable extent, costing over £1,600, and is from the designs of Messrs. Ashlin and Coleman.

We are glad to hear Mr. Sharp has several important orders in hand for England and Scotland, including an important commission of altar work for the Countess of Lovatt.

A shocking tragedy occurred on Monday night in the Madison-square Theatre, New York. Mr. White, the junior partner in the well-known New York firm of architects, M<sup>r</sup>. Kim, Meade, and White, being shot dead by a Mr. Harry Thaw, in consequence, it is said, of a personal difference between them. The firm are the most notable in the new world, and are amongst the few American architects who have done really scholarly work, such as appeals to the architects of the old world. Mr. White, strange as it may seem, is reported to be a millionaire, though whether he made his money out of architecture is not stated. It is only a couple of years since Mr. M<sup>r</sup>. Kim, the senior partner, was over in London, and was made the recipient of the Royal Gold Medal for Distinguished and Artistic Merit—a distinction annually granted by the Sovereign on the recommendation of the Royal Institute of British Architects, to some individual whom it is desired to signify honour for his services to art. The roll contains the names of some of the most eminent English and foreign artists of their day.

Mr. Stanford White was one of the most successful American architects. He designed the New York home of Mr. Whitelaw Reid, and the Century and Metropolitan Clubs, and he was the architect of Madison Square Garden Theatre, in which he met his death. Thaw was also a millionaire.



**WILLIAM PRESTON AND CO., LTD.**

It has been frequently said of the Irish commercial man that he lacks enterprise; and without arguing the statement we can at any rate point to one man who is a real and practical contradiction in the person of Mr. William Preston.

Our representative called recently at the warehouse of William Preston and Co., Ltd., Great Brunswick-street, Dublin, and was shown over the premises by the managing director (Mr. Wm. Preston), and we must say that we never visited premises more admirably adapted for their purpose. Before we say anything upon that point, a brief recital of the facts which have led up to the present title of the firm may not be out of place. Until February of this year the style and title of the firm was W. H. Bowers and Co., Ltd. For five years prior to February the firm was under the control and management of Mr. Preston (who is a cousin of Mr. Bowers), and from the moment when he assumed the reins of government the firm's trade developed enormously. Mr. Preston saw that the policy of handling goods only as agents of the actual producers was the correct one. It placed his firm in a unique position, and enabled the trade to buy upon terms hitherto impossible to obtain from the middleman. That policy was so well worked out that the wholesale business developed a rapid growth, and decided Mr. Preston, in February last, to dispose of his retail branch completely, as being an encumbrance to his policy, and his ambition to achieve greater things. When Mr. Preston decided that the firm should trade only as wholesalers, he also marked the occasion by a change in the trade title as at the head of this article. As the firm is practically owned, and solely managed by Mr. Preston, we think he was entitled to display his identity more prominently—hence the present trade title.

With regard to the sole agencies and direct representations held by the firm, those that will interest the readers of this paper are as follow: Lewis Berger and Sons, Ltd., the oldest and largest paint and color manufacturers in the United Kingdom. A huge stock is held of the paints, colors, and varnishes made by this celebrated firm. The dry colors are kept in excellent bins, each capable of holding a ton. Of course this firm also supplies ready-mixed paints for inside and outside work. A distinct speciality is the famous "B.P." which is a prepared paint, and recommended in preference to lead and oil mixtures. This paint is made from pure ingredients, covers more surface, and is always alike in colour, quality and consistency, and is more economical. We think in spite of the prejudice against prepared paints, we can safely say that those using "B.P." will find that it in every respect fulfils the claims of the makers. We may say that Berger and Sons have gained five gold medals for the excellence of their goods. Most appropriately another agency held is for Messrs. Hamilton and Co., Ltd., whose name is so well known as probably the largest makers of paint brushes in the kingdom. Needless to say that Messrs. Preston hold a large and varied stock of Messrs. Hamiltons' brushes. Morgan's oils and greases is another valuable agency. Morgan's oils for lubricating and greases for gears, etc., are known alike to the engineer and the motorist. For shafting, high or low speed engines, etc., the lubricants sold under Morgan's name have no superior. "Bengee" turpentine, made by Benjamin and Gee, of London, is said to be practically identical with American turpentine, and in some respects superior. Mr. Preston told us that large builders had supplied "Bengee" turpentine to their foremen painters, and the latter had no notion that it was not American turpentine. It gives best results as to hardness and finish, and is equally good as a drier. A speciality of the firm is Preston's Oxide of Iron, as to the merits of which we saw testimonials from such well-known builders as Messrs. James P. Pile, Collen Bros., Wm. Conolly and Son, Michl. Meade and Son, Geo. J. Crampton, Hy. J. Monks, etc., etc. There are other specialities, such as "Bakol," a substitute for cream of tartar in baking, recommended by Mr. David S. Jardin, A.I.C., F.C.S., analytical chemist; also heavy chemicals; and a huge trade is done in carburene motor spirit, which the firm import in special steamers. As to the warehouse in Brunswick-street, we were much struck by its substantial construction, its orderliness, cleanliness, and its systematic arrangement. The building is entirely made of steel and concrete,

and is fireproof. It is lit electrically, and is most admirably adapted for the requirements of the firm's trade. We were quite agreeably surprised at the manner in which the large stock was disposed in this building, and could readily understand much of the success of the firm under Mr. Preston's guidance—for truly his methodical mind has reduced the handling of a large and complicated stock to simplicity. The position of the firm to-day, the condition of its trade, and the policy that guides it, are alike most creditable to its young managing director.

### OUR SOUTHERN LETTER. (FROM OUR CORRESPONDENT).

**Railways.**

The Cork City Railways and Works Bill has now passed the second reading of the House of Commons, and has been ordered for third reading. The motion was carried by a large majority, and led to a very interesting discussion of the financial relations of the Great Western Railway, the Treasury, and the local bodies towards the construction of the railway, and also of the obligations undertaken by the Fishguard and Rosslare Railways and Harbour Acts, 1898, to construct a similar railway and also a junction between Cork and Fermoy.

The Bill was passed on condition that the sum of £25,000 was subscribed locally, and the Treasury have granted £25,000 towards the construction.

The Chairman of the Committee who investigated the evidence in connection with the Bill states that he thought the grant might be wisely made; that the construction of the railway was of extreme importance to the people of the South and West of Ireland, and that he had not seen a Bill showing better financial conditions, and that he was absolutely certain the scheme would be carried through.

**Sanitary Works.**

The Cork Rural District Council, against whom Miss Reeves obtained an injunction last year to prevent them from polluting the Rivers Tramore and Trabeg by allowing sewage and the refuse of dye stuff to flow into these rivers to the injury of her cattle and property, will now have to abate this nuisance, as the Court of Appeal have dismissed the appeal, and have ordered that the mill-owners, who were also brought into the action, must pay their own costs. The opinion of the judges was that it was not sufficient for the Council to guarantee immunity, that they must give immunity, and that they could not execute engineering works which would create a nuisance on a man's property and preclude him from taking action.

In connection with the sewage disposal works carried out by the Kinsale Board of Guardians, the Septic Tank Co., Ltd., have undertaken to remodel the tank at a cost of £146, provided that the data they have been supplied with as to the flow of the sewage be correct within 15 per cent. They also undertake to run the installation for three months, their liability ending after that period, subject to the approval of the Board's engineer and the engineering inspector of the Local Government Board, which approval must be expressed during that period, if possible.

The Macroom Urban Council are advertising for a Clerk of Works in connection with the sewerage works now in progress. He will be expected to be able to take levels, lay sewer pipes, and construct flush and sewer tanks, etc. One would have thought that the contractor should lay the pipes and construct the tanks.

**Waterworks.**

The Middleton Urban Council have given the contract for the construction of the supplemental water supply for Middleton to Mr. J. J. Coffey, contractor Middleton, who proposed to execute the works for the sum of £1,359, in accordance with the plans and specification of Mr. S. A. Kirkby, county surveyor, for which work the Local Government Board have sanctioned the loan of a sum of £1,600.

The Cork Waterworks Committee have received a very satisfactory report from their resident engineer, Mr. T. H. Rearden, who was newly appointed last year, and seems to have got the old pumping plant into as efficient condition as possible. He states that although the average level of the river below the crest of the weir for the past seven days was 2 feet 5 inches, the average height of water in the high level reservoir was 13 feet, and in the low level reser-

voir was 15 feet 6 inches. The filter tunnel is now in working order, and it is expected that the new pumping plant will be working within a year.

#### Town Hall.

The building of the new Town Hall is now nearly completed, and it is expected that it will be ready next week for occupation, when the City High Sheriff proposes to give a conversazione in the building to the members of the Public Health Congress, which meets in Cork this year.

The work has been carried out efficiently by Mr. John Delany, contractor, Cork, under the supervision of the present and past city engineers, and every effort is being made to prepare the Hall in time.

### EARTHQUAKES AND EARTHQUAKE-PROOF BUILDINGS.

By WILLIAM F. SCOTT, in the *Canadian Architect*.

A match will start a flame that will light a cigar. This same flame will light a city into an unquenchable blaze if the conditions of fuel and air supply are favourable and the provisions for fire protection unfavourable.

In the recent San Francisco catastrophe we have a case where the fuel was the wooden buildings and the air supply that ever present draught through the Golden Gate. The earthquake supplied the match and incidentally destroyed the water supply for fire protection, which under the most favourable conditions was not of the best on account of the steep hills throughout the city. This great western port of the United States was a wooden city, the exceptions where wood did not prevail consisting of a comparatively small percentage of buildings in the business section. The "Native Son" always gave as the reason for this fact that buildings of wood were safe against earthquake shocks and because of the non-combustibility of the California redwood were insured against a great conflagration.

That their faith in wood has been "shaken" and will be transferred to steel or steel concrete is the lesson written in the ashes of this catastrophe. The fire swept over an area of about seven square miles, and of the buildings in this burned district the modern steel frame structure stood out in grand contrast to all other types. They even stood the test better than might be expected because few of them were built in any way different from the conventional Chicago-New York Steel Skeleton which was designed to resist static loads and wind pressure only, and in which such strains as would be caused by an earthquake tremor were not considered. The cumulative resistance in the joints of these steel frames was undoubtedly a great factor in helping them to withstand the recent earthquake shocks, but to make this function positive the joints should be specially designed for the forces they must resist. Certainly reinforcement of this sort would add greatly to the power of the building to retain its enclosing materials from displacement.

That the steel frames stood the test is more than can be said of their covering or rather of the methods of binding the enclosing materials to their skeleton. The manner in which the brickwork between the steel framing of the tower of the magnificent City Hall fell in ruins about it is a good illustration of a vital point in the design of the conventional skeleton construction when applied to buildings that are to resist the strains of an earthquake shock. This tower was built on a steel skeleton frame well braced in the circumferential framing, but not provided with steel bracing in the vertical radial planes. The walls of the main building and colonnade, which formed the architectural base of the tower, were of ordinary masonry construction, and served the purpose of bracing the steel in the radial planes; thus when these walls were disturbed by the earthquake shock the tower was free to oscillate, which in turn caused the displacement of the spandrel filling between the steel framing.

The tremors of an earthquake pass over the face of the globe as waves in the fluid earth. They are more complicated than the waves of the ocean, but their effect upon a building is analogous to that produced upon a boat at sea. There is a vertical and horizontal force in the motions of these waves; therefore, if a building is to safely ride them it should be built with the same continuity and rigidity of frame as is obtained in the great ocean liner of to-day,

which, considered structurally, may be likened to a pair of huge curved plate girders braced transversely with trusses and gusset portals. The ideal earthquake-proof building, then, should be, figuratively speaking, an ocean liner on end with the stern supported on a sufficient base of concrete and with the windows built in the same manner as are the port-holes of the ship. But the architect is not permitted to make such radical departures from the conventional types of buildings. He must have square windows and pierce one-third his walls upon which he must write the alphabet of historic architecture. The ideal, therefore, is impossible, but a compromise between the ideal and the common type of skeleton construction is practicable.

It is beyond the scope of a short article to enter into details as to just what such a compromise would be; these details would vary with the individuality of every engineer who attacked the problem. However, I would premise three certain and fundamental requirements that must be considered in these details:

(1) There must be a rigid connection between the columns and girders of the skeleton frame, but flexibility must not be sacrificed to rigidity.

(2) There must be continuity in the foundation for the skeleton.—The writer is of the opinion that the principle of construction of the "lighter" should be kept in mind for these foundations.

(3) There must be a comprehensive method of binding the enclosing masonry with a view to making it an integral part of the skeleton.

Steel-concrete and steel were mentioned above as competitors for place in the faith of future earthquake-proof builders. The developments in this method of construction are comparatively recent, chronologically speaking, but there is no doubt that reinforced concrete will be an important factor in the development of these buildings. Earthquake-proof building, we have said, must have a continuity and rigidity of frame and must withstand severe shocks. The driving of reinforced concrete piles 35 or 40 feet in length without any shattering proves that the resistance of this material to shocks is very great; and as for the continuity and rigidity of this form of construction there is no more ideal method of obtaining both. It is just a question of placing sufficient reinforcing material where it will perform these functions.

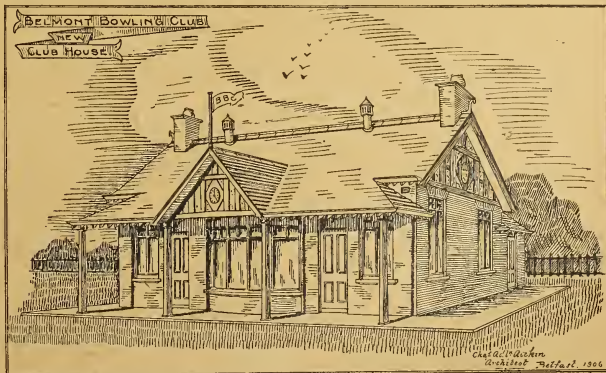
### BELMONT BOWLING CLUB NEW PAVILION, BELFAST.

The illustration on this page is of a new pavilion for above club. It is of clean brick with slated roof, and contains a club room 32 ft. by 16 ft., and at the back are gents' lavatory, urinals, and w.c.; a store, kitchen, and ladies' lavatory.

The club room can be divided into two rooms by means of a folding partition, two-thirds being in one room and one-third in the other. This arrangement would be suitable for days when ladies are present.

This pavilion is very soon to be opened, and the club is to be honoured by one of the international matches being played on their ground about the 12th of July.

The building contractor is Mr. Kirker G. Walker, who is doing his work very well indeed. The plumbing work has been entrusted to Mr. Stanley Johnston, who holds a good reputation, and the architect is Mr. Chas. A. Aickin, Rosemary-street, Belfast.





## CORRESPONDENCE.

## THE NEW CONDITIONS OF CONTRACT.

Letter from the Royal Institute of Architects of Ireland.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—I have been instructed to send the enclosed letter (a copy of one written by direction of my Council) to the Press.—Yours, &c., R. CAULFIELD ORPEN, Hon. Sec.

13 S. Frederick-street, Dublin,  
June 22nd, '06.

DEAR SIR,—Your letter of the 14th inst., forwarding a copy of a resolution adopted at a meeting of your Association with reference to this matter, was before my Council at their meeting on the 18th inst.

I am directed to convey to you an expression of the regret my Council feels that such misleading statements as those contained in the resolution should have been sent for publication to the daily Press. It would be inferred from the terms of this resolution that my Council had made no effort to elicit the views of the Master Builders' Association on the revised conditions, but what are the facts? So long ago as the 5th of February last, my Council passed the following resolution:—"That the general conditions of contract have not, as yet, been submitted to the members, and that a copy of them be submitted to the Master Builders' Association with an invitation to express their views thereon."

A copy of the conditions was duly sent you on the 9th of February, and you wrote on the following day acknowledging its receipt, and stating the matter would have the attention of your Committee at an early date. No further communication having yet been received from you, after four months, my Council could only conclude from your silence that your Committee had no serious objections to raise. The question of revision has been under the consideration of the Council for several years past.

It was, however, kept in abeyance for a considerable time after the publication of the revised conditions of the British Institute, in order that the working of the latter might be tested by practice. As matters have turned out, the wisdom of this course has been fully justified.

I should mention that my Council had also before them conditions specially prepared by the master builders and expressing their views.

In preparing the revised conditions my Council have adopted as a basis the conditions of contract in present use, and have made only such alterations as it deemed necessary to bring into line the small changes which individual members had introduced from time to time in their copies of the conditions; to correct inconsistencies of expression, to meet the requirements of recent legislation, and to facilitate the certifying and settlement of contractor's accounts. In the changes which have been made, the interests of the building contractor were never lost sight of, and the revised conditions are in several respects more equitable to them than the present conditions.

My Council notes with surprise the willingness of your Association to sign either the conditions of contract at present in general use or those adopted by the R.I.B.A., notwithstanding that their provisions on the subject of arbitration are irreconcilable; and it believes that, on a more detailed examination, the changes which have been adopted will be found to be neither "inequitable nor unfair."—I remain, yours faithfully,

(Signed) R. CAULFIELD ORPEN, Hon. Sec. R.I.A.I.

To John Good, Esq., Hon. Sec.  
Master Builders' Association,  
55 Great Brunswick-street.

## BUILDING SURVEYORS.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—With reference to building surveyors and their liability, I understand the custom in Dublin is for the surveyor to be responsible for the correctness of his quantities as a whole, even though (with few exceptions) he provides a clause stating non-responsibility, which latter is really only to protect him from any false claim, picking out little items short, and no notice taken of any excess items by contractors, and also to be clear of the architect's shortcomings, many of whom give no specification, and only very rough plans without detail drawings, and occasionally vary and leave incorrect both plans and specification after the quantities are issued, the contract signed, and without the knowledge of the surveyor, who, in due course, is sure to hear from the contractor (or even the architect). If surveyors are to guarantee their quantities they should hold complete copies of the plans and specification from which the quantities were prepared, signed and dated, and charge the expense, in addition to the usual cost Copies of Bills, to protect the client. Architects, surveyors and builders inform me this would be the real solution of the question, and, I believe, is the case in England. I further understand, and know, unfortunately, that if architects were to guaran-

tee their work, few of them would be paid by a client at the completion of a contract; hence architects very often desire to settle accounts with certain builders, particularly without a surveyor, and a few other reasons might also be given.

I am aware of some very bad cases with four Dublin architects and one Belfast man which came under my notice, and four contractors' claims—very bad, indeed. I may say I have been a considerable loser by the incompetence and want of moral dealing by both architects and contractors and two surveyors (latter best of the lot) with whom I had to do.

The quantities being made part of the contract, not merely a "schedule of prices," should be adopted in the absence of any guarantee, and is occasionally with advantage, and I found it so.

I read a letter of Mr. Morris, surveyor, in a late issue of your journal. I thought there would have been some notice of surveyors' responsibility, but I saw none. In conclusion, I may mention I visited the Royal Hibernian Academy last week and saw the usual contemptible designs and drawings furnished by architects, with just two or three exceptions, the same year after year. Most of these gentlemen should have been at some business, anything but architects and artists.—Yours,  
A BUILDING OWNER.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—A building, in course of construction, collapsed in Eiffe Strasse, Hamburg, on Tuesday, 19th June, 1906, killing five persons. This so seldom happens that it would be interesting to know the cause of the collapse, and the material of which the building was constructed.—Yours, etc.,  
M.

[We are not acquainted with the particulars of this case, but we are making some inquiries on the subject. Possibly some of our readers may be better informed on the matter than we are, and favour us with the desired information.—Ed.]

## CLONTARF DRAINAGE.

The following letter from Dr. M'Walter appears in the daily Press:—

"SIR,—Owing to the hurry consequent on the mandamus requiring the Corporation to put a drainage scheme for Clontarf into operation, I fear that a grave defect exists in the one adopted. The memorandum descriptive of the scheme states:—'Provision is made in the sewers for the conveyance of five times the average dry weather flow, called five volumes. Of this quantity three volumes will be conveyed to the Dublin main sewers, and the excess will be discharged into the sea. The point of the latter discharge will be near the Great Northern Railway.' In other words, after any wet day two-fifths of the entire volume of the sewage will be discharged near the railway wall, and any unfortunate citizen who wishes to take a bath between that point and the Bull Wall must dip into this diluted sewage. It appears rather expensive to pay £52,000 for the privilege of having your sewers discharge into the sea so near your dwellings, and, periodically, pollution of the tidal waters. It is hard not to sympathise with the Clontarf citizen. As he passes from Dollymount to the railway bridge he will inhale the odours of the sewers as the foul fluid exuding from them floats over the sea water, and once he goes under the bridge the putrefactive horrors of the sloblands are inhaled with every breath. Should he wish to bathe, the noisome stench of sewers invades his nostrils, and instead of the wholesome sea, infinitely diluted drainage water laves his limbs.—Yours truly,  
"Dublin, June 23rd."  
"J. C. M'WALTER."

[NOTE.—We think Dr. M'Walter is under some misapprehension in supposing that two-fifths of "the sewage" of the district will be discharged into the sea. The usual practice is to discharge a proportion of the sewage by storm overflows when it has become diluted to the extent of five or six times. Ordinary domestic sewage diluted to this extent, it is not generally known by those unacquainted with such matters, is perfectly liquid and comparatively clear. The solids by this time having all become broken down, there is little chance of any finding their way through storm overflows. The discharge from such storm overflows, coming into operation only in very wet weather, would be rapidly dissipated in the wide expanse of the sea. To provide for the whole of the storm water being dealt with at the point of treatment, or main outfall, is never practical, because it would involve making the sewers so large, in order to accommodate the largest possible floods, that under normal conditions the sewage would not flow freely enough to clear the sewers under normal conditions. Nothing has been more conducive to proper sanitation than the modern practice of properly proportioning the sewers to the work to be done. Long ago people thought a sewer could not be big enough. These are all very elementary facts to those concerned with such work, but the general public often forget or are unaware of them.—Ed.]

## HOSPITAL WORK IN LONDON.

It will be remembered that about a fortnight ago the King formally opened the new King Edward VII. Sanatorium at Midhurst, and in connection with this, Messrs. Doulton and Co., the famous sanitary engineers, of the Royal Doulton



Potteries, Lambeth, London, send us an interesting booklet entitled, "Hospital Work in London." Messrs. Doulton's particular interest in the opening ceremonial carried out by his Majesty consists in the fact that all the sanitary fittings in the sanatorium were of their manufacture. It is quite unnecessary to refer to the excellence of Doulton ware, but we may mention that the firm has devoted special attention to the manufacture of hospital requisites. It is these that have been used in the Midhurst Sanatorium, and also in many of the principal hospitals in London. They are fully described in the booklet to which we refer. It also contains a deal of interesting matter relating to pottery and its history, with special reference to its location at Lambeth, the name of which Messrs. Doulton have made famous throughout the world. It appears that there are numerous specimens of Lambeth delf, dating as far back as 1631. It was not, however, until 1815 that the founder of the present enormous ceramic business, Mr. John Doulton, came to Lambeth, and opened a small pottery. In 1826 he was employing about a dozen hands, and working one kiln a week. The growth of the firm, established now more than 90 years, has been very great. At present they use some 2,000 tons of clay per week, and nearly the same weight of coal, and are responsible for 4,500 employees, including hundreds of the best artists and designers in every species of artistic and utilitarian ceramics. The booklet is one which we strongly recommend to our readers.

## GERMAN ENTERPRISE.

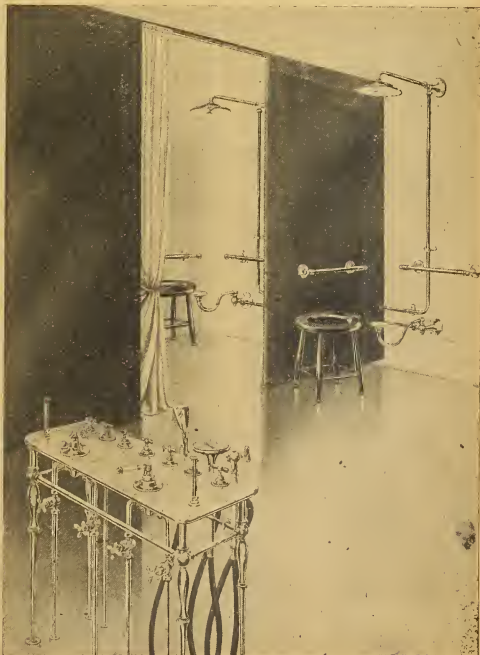
The astuteness and business enterprise of the Germans is well exemplified by the history of how they collared a large American industry. For many years the State of Maine derived an enormous income from the export of what are called "shooks" for box making. These are the sides, bottoms, etc., of the boxes and prepared ready for putting together, and are shipped parcelled up, each parcel being the shooks necessary for one box. The principal export is to the great lemon and orange growing countries of the South of Europe, and though the Maine manufacturers had always to compete with the Germans, the latter used to saw out the boards, whereas the Americans had a special machine for cutting the shooks. This so cheapened the production as to give the Yankees a monopoly of the trade, and for several years as many as four million boxes were shipped each season from the State of Maine. Now, this machine was exhibited at the Buffalo Exhibition of 1901. Many Germans were there, they saw the machines, took a fancy to them, bought numbers, and promptly installed them in mills in Austria, principally at Trieste. Here they have labour extremely cheap, and are practically on the spot for the trade of Southern Europe, with the result that they have absolutely killed the Maine shook trade. The Americans are now saying they could have done with fewer foreigners at the Buffalo Exposition.

## THE EMPLOYMENT OF IRISH ENGINEERS.

Our London contemporary, *Civil Engineering*, in a note in the current issue, takes exception to the engagement by the Corporation of Dublin of an outside or private practitioner as consultant in view of the fact that the City Engineer, Mr. Spencer Harty, is well qualified to supervise the preparation of the design for the extension of the Vartny supply to Dublin. In our last issue we congratulated the Corporation for having employed a local practitioner, Mr. Bergin. If we thought that this action was anything in the nature of a slight upon Mr. Harty we should be the very first to strongly condemn it. If Mr. Harty has time and is willing to act as supervisor of such work, the designs for which have been prepared by his assistant engineer, Mr. G. J. O'Sullivan, C.E., then the action of the Corporation is most reprehensible, for no one is so well qualified for such work in connection with the Vartny as Mr. Harty, who has unique experience of hydraulic engineering. He has, however, very important and onerous routine administrative functions to discharge, which make large demands upon his time and energies, and

if a consultant is necessary to relieve and assist him with some of his duties, it is only fair that a local man should be engaged, provided he is qualified for the work, and it is a welcome break in the monotonous procedure of sending such commissions to London.

By the way, our contemporary credits the Corporation with the intention to supply this additional water system from Lough Katrine! We have heard many charges of extravagance levelled against municipalities, in particular the Corporation of Dublin, and we are not in the confidence of the responsible engineer in charge, but we have never heard of quite so extravagant a proposal, which, to say the least, would be a trifle expensive. Doubtless, however, there would be no lack of engineers willing to essay the task were it offered them. Our contemporary is, however, we think, a little "at sea" in the matter, for which in all probability the eternal printer—whose shoulders are so broad, is to blame for the slip, and not the editorial department. The current issue of our red-covered contemporary is a very good number.





## LAW.

**Pearson v. Dublin Corporation—Judgment of the Court of Appeal.**

On Tuesday, in the Court of Appeal, consisting of the Lord Chancellor, Lord Justice Fitzgibbon, and Lord Justice Holmes, judgment was delivered in the case of *Pearson v. Corporation of Dublin*, arising out of a claim for £36,000 for work done in connection with the construction of precipitation tanks for the main drainage scheme. The appeal was brought by the Corporation against the decision of the King's Bench Division reversing the proceedings at the original trial, when the Lord Chief Baron directed a verdict for the defendants in the action.

The Lord Chancellor, in delivering judgment, said the only question in this case requiring serious consideration was whether, at the close of the case, there was evidence to sustain an action for deceit. It was admitted in the King's Bench Division and here that it could not be sustained under the contract. The contractors made their claim under paragraph 8 of their statement of claim. It was unnecessary to repeat all the particulars as to terms under which the plaintiffs, as contractors, agreed to execute certain outfall waterworks at the Pigeon House Harbour. The contract incorporated certain plans, and they undoubtedly showed that a certain wall at the River Liffey side should be utilised by the tenderer for the purpose of retaining tidal waters, and the plaintiffs contracted to put a concrete wall against this. And it was agreed that this concrete wall should be constructed as indicated on the plans and on the existing wall. The fourth paragraph of the statement of claim stated that the wall purported to be accurately shown on the plans to go down at least 9 feet below ordnance datum. It was alleged that, as a matter of fact, these plans did not show the state of the wall, and that volumes of water poured under the new wall, rendering pumping necessary. The 8th paragraph of the claim showed that the plaintiffs framed their action on deceit—that the defendants had falsely represented to the contractor the existence of this wall, that its foundations were correctly shown on the plans, and that this foundation was adequate to keep out tidal waters, and that the defendants had in their possession information to the contrary, and had wrongly induced by their representations the plaintiffs to enter into the contract. They averred falsity, and claimed damages which they had suffered by the defendants' fraudulent representation. Fraud had been defined by Lord Herschell: it could be either intentional, a representation made without any real belief in its truth or a statement made recklessly. It was said in this case that a representation was made without any belief in its truth. But if this statement was accompanied by other contemporaneous statements in the same document, and it was material in an action of deceit to show that the false representation was made with the intention that it should be relied on by the person deceived. The drawings and specifications showed that a large chamber should have been constructed with a concrete floor and a number of precipitation tanks; and these, of course, should always be dry. It was said that there had existed near the Pigeon House an old harbour that might be used in connection with these; and if the old wall alleged to be there were made watertight and concreted it would save considerable expense. Of course, it was necessary to exclude the tidal waters from this. This could only be done by proper damming. It was originally stated that 880 feet of the wall could be utilised and made watertight, and that as it stood it could be lined with concrete, and would be capable of protecting the tanks from tidal waters. His Lordship would assume that the plans showed that. The evidence of the plaintiffs was quite correct as to the meaning of dotted lines; they meant works below the surface. The wall in fact rested on the bed of the river, and became useless for the purpose. Thus it became plain that the original plan could not be carried out. The contractor treated himself as being bound to carry out the works, and relied on whether he could claim for false representation and proceed with the walls. Now, the Court had to consider what representations were made. They were set out in the 8th paragraph. The Court would

not have to consider the case as if it stood on the plans alone, apart, and as one contract, but the specifications must be read with the plans and see whether there was a false representation in point of law, so as to found an action for deceit. He was of opinion that there was not. The Corporation said the contractor must act entirely on his own judgment. It was an essential characteristic of fraud that the representation should be false to the knowledge of the person making it, but here the matter was not alleged to be so false, nor that the person acting on it was intended to act on it. He was to investigate for himself. He was warned not to act on the drawings and plans alone. His Lordship failed to see that the plaintiffs, on whom it lay to do so, had proved affirmatively such false representation as to the wall being watertight. The defendants had given the information as being the best in their possession, but did not hold themselves responsible for its accuracy. He was of opinion that the Lord Chief Baron was right in directing a verdict for the defendants.

Lord Justice Fitzgibbon, in concurring, said a certificate for completing this work had been withheld, and there was no evidence that it was wrongly withheld. Having read the allegations and claims of the plaintiffs, his lordship said the question whether the plaintiffs had discharged the burden which rested upon them of proving that they suffered this damage through the false representation of defendants, depended upon the terms and import of the representation. There was no warranty as to the wall whatever, otherwise than was contained in Article 43. The Lord Chief Baron had said that there was a clear representation on the plans, that this wall went down nine feet below ordnance. He (the speaker) was not sure he could go so far as that in favour of the plaintiffs, but would say that they did show that a wall existed there. This wall was of the essence of the claim. Having referred in detail to the scheme, his lordship said the contract did not bind the contractor to go on at his own expense by building a wall in its place where the supposed old wall did not exist, and really the losers by the wall were the Corporation and not the contractor. He was of opinion that the statement as to the wall being nine feet below ordnance datum had not been proved, and no reasonable jury could find a verdict against the defendants in the present case. The judgment of the Court would be that the verdict should be entered for the defendants; that the appeal must be allowed with costs; the order of the King's Bench would be discharged, and the order of the Lord Chief Baron restored.

Lord Justice Holmes also concurred.

**Neglecting to Supply Water.—Magisterial Decision.**

At the North London Police Court Mr. Fordham delivered a considered judgment in the case of *"Paine v. the Metropolitan Water Board."*

Mr. Fordham said the summons was taken out under Section 43 of the Waterworks Causes Act, 1847, for neglecting to supply water by measure to the complainant at his request. The complainant, who is a builder, of Stoke Newington Road, being desirous of having a supply of water by measure for use in his building operations, which was a purpose other than the purpose in respect of which rates are by the East London Waterworks Act, 1853, provided or limited, requested, through his solicitors, the defendants, as successors to the water company, to supply him with water by measure, and he tendered with that request the sum of £2 2s. in payment of 25,000 gals. of water at the rate of 9d. per 1,000 gals.—the maximum price—and for what he considered would cover the cost of laying the supply from the street in which the main was laid to his land. The defendants neglected to supply water by measure to the complainant, who asserted that they were in consequence liable to penalties for such neglect.

The defence put forward by counsel for the Board was that they were not bound to supply water by measure, because the complainant was not the owner or occupier of any "premises" situate in or adjoining any street in which any main pipe or service pipe of the defendants was laid, and so could not claim a supply of water under Section 79 of the East London Waterworks Act, 1853, and it was argued that the spot at which the supply was to be used could not be described as "premises" within the meaning of the section, and therefore that the complainant was not en-

titled to a supply of water by measure, but must take water for his building operations by agreement with the defendants under section 78 of the Act. But he (Mr. Fordham) thought this Act was one that should be construed liberally in favour of the individual. In section 79, under which the complainant claimed a supply, there was nothing about the supply being upon premises, and considering the two sections 78 and 79 of the Act together, it seemed to him that the intention of the Legislature was to enable the owner or occupier of property adjoining a street in which there was already a main or service pipe to obtain a supply of water for purposes other than purposes for which rates were provided and limited by the Act, at a certain price, as distinguished from owners and occupiers of property not so situated as regarded a main or service pipe, with whom the water company was left to make an agreement on terms to be settled between the person requiring the supply and the company.

If this view of the section was correct the complainant was clearly entitled to the supply he claimed under section 79, since he was the owner and occupier of "premises" in the commonest use of the word. But if this view of the section was incorrect, and by section 79 an owner or occupier of premises was only entitled to the supply under consideration upon premises of which he was the owner or occupier, it became a question whether this land, which had as yet no houses built upon it, and on which the supply of water was wanted, could be included in the description "premises," as used in the section, and that was a somewhat difficult question to decide.

However, for reasons which he gave in detail, the magistrate came to the conclusion that this land came within the meaning of the word "premises" as used in section 79 of the East London Waterworks Act, 1853, and said that it was evident from section 83 of the Act that it was intended that the water company should supply water by measure to "land," as distinct from "buildings." He must hold that the complainant was entitled to the supply of water by measure, and that the tender which he made of £2 2s. was a sufficient compliance with the Act. He fined the Water Board 40s., and ordered them to pay 10 guineas costs.

Mr. Munro, for the board, asked the magistrate to state a case for the opinion of the High Court. He was not prepared to name his point of law at present.

Mr. Fordham said that when counsel had found the point of law he would consider the application.

#### Engineer's Action for Fees.

His Honor Judge Barry had before him at Naas Quarter Sessions the case of John J. Ramsay, C.E., Dunlavin, v. John Sandall, of Woodville, Brannoxtown, farmer, and George Leycester Penrhyn, of Rathasker, Naas. The action was brought to recover £13 2s. for professional services rendered by the plaintiff for defendants in drawing plans, etc., for the defendants. Mr. W. G. White, solicitor, appeared for the plaintiff, Mr. McCann for Mr. Sandall, and Mr. W. A. Lanphier for Captain Penrhyn.

The plaintiff swore that he was employed to map out measurements of Stonebrook Cottage by the defendants in connection with proposed alterations.

Mr. Sandall swore that he was about letting Stonebrook Cottage to Mr. Penrhyn, and the latter required repairs and alterations to be carried out, and suggested that plans should be drawn by a competent engineer. Witness then recommended Mr. Ramsay. Mr. Ramsay, replying to Mr. Lanphier, said he looked upon Mr. Sandall as his principal.

Mr. Penrhyn was examined by Mr. Lanphier. He swore that he entered into negotiations with Mr. Sandall for the letting of Stonebrook Cottage, near Ballymore-Eustace. There were 50 acres of ground attached to the land, but the house was too small for his purpose. Mr. Sandall suggested that Mr. Ramsay should make an inspection and prepare plans, and witness agreed to meet Mr. Ramsay, and see what the cost would be. About a week after witness was on the ground. Anything that was said about preparing plans was said by Mr. Sandall. Witness had plans sent him. He did not approve of the alterations, and the house did not suit him. Mr. Ramsay subsequently had dealings with him, but never suggested that witness was liable to him. Cross-examined by Mr. McCann—The house was unsuitable. Witness did not say that he would get an estimate of the alterations which he required. Mr. McCann—Do you remember meeting Mr. Sandall outside the Court-house at the last Quarter Sessions? Witness—Yes. Did you say to him that you would pay the bill if it had been sent in time? I said nothing. I turned my back, and walked away. His Honor gave a decree against Mr. Penrhyn, and dismissed the case of Mr. Sandall.—*Leinster Leader.*

#### A Mosaic Flooring.

The Hon. the Recorder resumed the business of the City Sessions at Green-street Courthouse last week.

Messrs. Craven, Dunnill and Co., Ltd., Jackfield, Shropshire, manufacturers, sued Messrs. H. and J. J. Martin, Ltd., Dublin, for £23 3s. 4d., being a sum due for supplying 33 yards of mosaic flooring for the new lounge in the Hotel Metropole, for which work defendants were contractors.

Mr. Harry Hannah (instructed by Mr. Furlong) appeared for the plaintiffs, and Mr. Timothy Sullivan (instructed by Mr. Robinson) defended.

The evidence showed that the flooring was to be supplied according to a design furnished by the defendants, which was the same as the existing mosaic floors already in the hotel. The defendants, however, contended that the flooring supplied was not the same either in colour or in outline as the design, and the architect ordered it to be taken up. The plaintiffs replied that the design was accurate, and that there was no definite stipulation as to colour.

The Recorder held that on the documents the contract was one for goods sold and delivered, that the goods were accepted, and that the purchaser, before he utilised them, was in a position to ascertain whether they were in accordance with the contract or not. The question then arose as to whether the defendants were entitled in law to the set off they claimed by reason of the fact that the goods were not in accordance with the contract. On this point his lordship decided in favour of the defendants, and allowed a set off of £6 to be deducted off the amount of the decree, which he gave for the amount claimed by the plaintiffs.

#### THE OWNERSHIP OF OLD LEAD.

##### An Alleged Trade Custom.

A curious case was tried at the Commission on Wednesday, in which a registered plumber named John Kelly was charged with having appropriated to his own use a quantity of lead and zinc, the property of Mr. Daniel Tallon. The accused, it appears, was employed by the plaintiff to strip old lead and zinc off the roofs of some of his houses, and to put on new lead. He put on the new lead, but took possession of the old, stating afterwards to the police that it was a perquisite usually allowed on such occasions and that he was entitled to it. Another plumber gave evidence to the effect that such a custom existed in the Dublin trade, and that "the material might be taken by the plumber, provided the owner did not object." But might not anything, from a pot to a piano, be taken, "provided the owner did not object?" In this case, as it appears, the owner most emphatically did object; and the jury found the prisoner guilty of larceny, but with a strong recommendation to mercy, a recommendation which was approved and acted on by Mr. Justice Kenny, who evidently leant to the view that the defendant acted honestly. He therefore allowed him out on his own recognisances in £25 to come up for judgment if called upon. The moral of the case is, we suppose, that, custom or no custom, you should never take another man's watch or scarf-pin, unless you are quite certain that he "does not object."—*Evening Telegraph.*

Messrs. G. R. Speaker and Co., of 29 Mincing Lane, London, E.C., have been appointed sole concessionaires of the British patent rights for "Eternit" Asbestos Roof Slates.

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## THE FRENCH RENAISSANCE.

A charming and scholarly series of essays are those of Mr. Reginald Blomfield, which have lately come from the press under the style and title of "Studies in Architecture." Mr. Blomfield is familiar to most architectural readers as a graceful and accomplished writer, his history of "Renaissance Architecture in England" being particularly readable, as well as being sound in scholarship. The present volume comprises a series of essays on various subjects connected with architecture. Mr. Blomfield says that architecture is a difficult art, and is less popular in England than in other countries, the reason being, he adds, that writers deal with it as a matter of dates and figures—and there is much truth in the saying. He adds that the problem for the critic is to find in architecture "the personal equation of the architect"—to read his personality in his works—for, after all, the vital interest of architecture is the human interest, not merely the reflection of social habit, but the play of personal temperament. Originally the essays on architecture appeared, some in the *Quarterly Review*, the remainder in the *Architectural Review*.

Take it all round, there is probably no more interesting period or country in Europe than France in the sixteenth century. The Renaissance in France

had, of course, reached a development not known in England. Yet Mr. Blomfield remarks that England has suffered far less than France from wanton destruction, for most of the great English houses, with few exceptions, have survived to the present day, whereas in France probably half of the finest examples have sunk to base uses or disappeared altogether.

The history of that period is full of interest; the social customs had a development and a polish unknown in other countries. The flavour of mediævalism still clung to England. Withal, it was a sturdy old age, unlike the decadent phase of French Gothic, which perished; while yet our later Gothic work was yet full of grace, beauty, and life, if it lacked the fuller vigour and strong dignity of the earlier periods. Probably the difference in the social customs of the two countries had much to say to the marked contrast.

Mr. Blomfield reminds us that the chief efforts of the Renaissance in France concentrated on house building, and the great houses were the first to suffer the violence of the Revolution. The French aristocracy were themselves in different to, and evidently did not have that love of, the old family place so inherent in the English aristocracy and landed classes. A prince of the House of Condé destroyed in 1799 the Chateau of Fere en Taidinois, while later he sold the Chateau de Creil for old materials in order to save the cost of maintenance. The demolition of the Chateau de St. Maur, one of De l'Orme's works, was also due to the Condé family. These facts are mentioned to explain the extraordinary destruction which occurred long prior to the Revolution. Moreover, many of the French aristocracy had a mania for building on an impossible scale. Francis I., says Mr. Bloomfield, ordered a palace, or a hunting box, on a scarcely less magnificent scale, whenever the humour seized him—but he had lost interest in the project before the roof was on. So, too, Catherine de Médicis. The Chapel of the Valois was never finished. After barely starting the Tuileries she began the costly undertaking of the Hotel de Soissons, but neither was finished when she died. After Catherine's death there was a lull, but the work that followed in the first half of the seventeenth century is described by Mr. Blomfield as admirable. France, says he, "held its breath," for the colossal enterprise of Louis XIV. there followed the cost of Versailles, after which there were few opportunities of Royal buildings, for a century later the Revolution swept all before it.

In passing, Mr. Blomfield gracefully records the services rendered to art by one Frenchman under surprisingly difficult conditions. During the height of the Revolution Alexander Lenoir went about searching for such fragments of sixteenth century art as might have then survived the storm, praying, entreating, and doing work of inestimable value to future generations. From an architect named Julien he bought the column to Henry III., now at S. Denis. He saved the frontispiece of Anet, and the gateway of Gaillon, now in the Ecole des Beaux Arts, the fragments of the screen of S. Germain L'Auxerois, the altar of Ecoun. Mr. Blomfield says that Lenoir put his fragments together much as Wyatt did at Salisbury Cathedral, and words could convey no more. Still the man is entitled to the deep gratitude of those who have followed and reaped the advantages of his apparently unselfish labours during an awe-inspiring time of terrorism and bloodshed.

The phases of architecture which followed the Revolution, hardly justify our following Mr. Blomfield in his comparatively brief review thereof. He records what is interesting, however, namely, the fashion in which, bit by bit, modern

\* "Studies in Architecture," by Reginald Blomfield, A.R.A., F.S.A., M.A. Exeter College, Oxon, Architect London: Macmillan and Co., Ltd., 1905.

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study has laid bare the history of the earlier French Renaissance.

Some of the earliest efforts of French Renaissance appeared at Avignon and Marseilles. Mr. Blomfield notes, too, what has often struck us as a most characteristic and unique peculiarity of Southern France—namely, that scarcely two hundred years elapsed between the last efforts of Romanesque in the south, and the first attempts at Neo-Classic. In other words, to use Mr. Blomfield's phrase, the old tradition must have been very near to the mind of the Provençal. Elsewhere in France it was, of course, quite different. There Gothic had reached an unrivalled height; and of the masons who here followed, and built the winding staircases of Blois and Chambord, they could hardly have been inferior in skill to the Gothic masons from whom they inherited their craft. Mr. Blomfield gives the keynote of his essay, however, when he says that the problem at the end of the fifteenth century and the beginning of the sixteenth was how to bring this building ability into such a frame of mind that would enable it to give expression to the new ideas that were every day gaining ground, for the winding staircases had little of the "Neo-Classic," as Mr. Blomfield accurately enough terms the style, though it is not a particularly happy appellation for the singularly beautiful Early French Renaissance, which, as Viollet-le-duc has pointed out, retained much of the freedom of Mediæval work, coupled with a greater accuracy and grace in the adaptation of the details of the new style than prevailed in England even at a later period. The repeated failure, nevertheless, of the masons to grasp the new intention possibly accounted for what Mr. Blomfield calls the positive fury of building which possessed Francis I. and the great noblemen of his court. Their ideas were beyond their time.

In the first dawn of the Renaissance in France was when René of Anjou introduced certain Italian artists, who worked for him during the latter part of the fifteenth century at Aix, Bar-le-duc, and Angers, and the next considerable importation occurred after Charles VIII.'s Italian expedition of 1495.

The culminating point of the earlier Renaissance, according to Mr. Blomfield, was reached at Gaillon, built for the Cardinal George D'Amboise, of whom it was said, that he lived so full a life as to scarce leave himself time to go to bed and die. Of Gaillon nothing remains save a poor fragment in the Ecole des Beaux-Arts.

Mr. Blomfield, on the evidence before him, pronounces Gaillon to have been very poor stuff indeed, despite its magnificence and its size. There was no architect, and all that was expected of the craftsmen was to put up walls good and strong enough for Italian artists to embellish.

The passage in which Mr. Blomfield best sums up the difference between France and England, in regard to the early Renaissance, is that in which he says:—

"In France, as in England, the first fifty years of the Renaissance were occupied with experiments in the detail of ornament, but the difference is that, whereas in England the Italian influence disappeared at the death of Henry VIII., and was too weak to establish a permanent footing, in France the development of architecture proceeded steadily to its full maturity, with the result that France got a start of England of some fifty to seventy years—a lead which that country has never lost." "The man," he adds, "who contributed most to this result was Francis I., 'un amateur du premier rang.'"

Mr. Blomfield says France learnt civilisation of Italy, and there is undoubtedly something in it.

The times of Francis I. were golden days for artists. One of the King's Italian favourites, Primaticcio, was made Abbé of St. Martin es Aires de Troyes. Pierre Lescott was a Canon of Notre Dame. Philibert de l'Orme, the architect, was also a Canon of Notre Dame, in addition to which he enjoyed the revenues of two or three abbeys; in fact, nothing is more significant than the wealth and position which the French architects seemed to have possessed during

the whole period of the Renaissance, an influence they have to some extent maintained to the present day.

Mr. Blomfield gives us a good deal of information respecting the chief French artists of the time, and devotes some attention to the relative claims of painters, sculptors, and architects, to have influenced building design of the period. Primaticcio seems to have been, for thirty years or so, the most notable and influential artist of the Court, though there is no evidence that he had any title to be called an architect; yet one of the first acts of Francis II. was to dismiss that great architect, Philibert de l'Orme, to whom, by the way, Mr. Blomfield devotes a separate essay, so that he does not figure so prominently in the Essay on the French Renaissance. De l'Orme railed much against the Italian importer who supplanted him, and against the folly of princes who employed such men. De l'Orme is dead many a year; his criticism holds good to-day, and probably will to the end of time. Philibert de l'Orme was probably the first French architect properly so called. He was the first to introduce the modern system of careful drawings to scale prepared by men whose business it was to design, but not to erect, buildings. From the essay we learn a great deal of Bullant, Jean Goujon, and others of the French artists, but space forbids our referring to them in detail.

The fruits of the Renaissance Mr. Blomfield sees in the present position of modern French architecture, viewed as a school. Of it he says—The lesson of it is to be found "in its distinction, its technical accomplishment, its unflinching instinct for scale, and, not least of all, in its power of combining and co-ordinating all the arts, the painting, sculpture and architecture." In this architectonic treatment of the arts it is that the French "conspicuously excel."

The essay we have quoted from is but one of several, and all are of interest. Mr. Blomfield continues the subject of the French Renaissance in a monograph of De l'Orme, and another essay entitled, "The Italians at Fontainebleau." Other essays are—"Byzantium, or Lombardy," "Andrea Palladio," and "The Architect of Newgate." There are a considerable number of well-chosen illustrations from photographs and from sketches by Mr. Blomfield.

## COMMENTS.

### The Dublin Master Builders and New Conditions of Contract.

At a largely-attended meeting of the members of above Association, held on Thursday, 4th June, in the Grosvenor Hotel, Dublin, the following resolution was adopted unanimously on the motion of the President (Mr. James Beckett), seconded by Mr. James Kiernan:—"That although conditions of building contract have been under consideration for many years, we now regret to learn from the public Press that the members of the Royal Institute of Architects of Ireland have at a recent meeting adopted without discussion a set of conditions without any consultation with the Builders' Association as to their views on a matter so vitally important to their interests, contrary to the custom and practice adopted in England and Scotland, where this matter was the subject of many conferences between the architects and builders prior to its mutual adoption. While willing and anxious at all times to carefully consider any proposals whereby equitable terms on contract might be agreed on, we respectfully decline to be forced to accept or sign conditions which are, in our opinion, inequitable and unfair, and which differ materially from any accepted conditions at present in use in the United Kingdom. The members of the Association will continue to accept and sign the conditions of contract at present in use in our city, and also those agreed on between the Royal Institution of British Architects and the Association of Master Builders of Great Britain and Ireland." This action on the part of the master contractors of the city is a retort to the decision of the Royal Institute of Architects in adopting the conditions as put forward by the Council. Whether it will result in a struggle between the architects and the builders in regard to the signing of these conditions, remains to be seen. Of course, the importance of such an issue would greatly depend

upon the number of architects who adopt the new conditions. At the present time the old form is by no means universally adopted, several architects having for some time past used the British Institute's conditions, while quite a large number have special forms of their own, in some of which there is no arbitration clause. It seems a pity that it has not been possible to agree upon some form mutually acceptable, and which might be urged for general adoption.

#### "The Architect" and the Dispute about Conditions of Contract in Dublin.

Our contemporary, *The Architect*, thus comments upon the difference which has arisen between the Dublin master builders and the architects, in consequence of the adoption by the latter of the new conditions:—

"There must be something peculiar in Irish air which makes union among its people an impossibility. The poet who described the country as 'a heap of uncementing sand' was not a geologist, but he understood the character of his countrymen. Why, for example, is it impossible for the architects and builders of Dublin to be able to agree about conditions of contract? The subject has been under debate, but apparently a one-sided one. The following resolution by the Master Builders' Association reveals an Irish peculiarity: 'Although they are unable to agree with their countrymen, the builders announce that they are prepared to accept the conditions agreed on between the Royal Institute of British Architects and the Association of Master Builders of Great Britain and Ireland. In other words, anything is acceptable so long as it is not native.'"

This is always the way with English people and English papers—an utter inability or unwillingness to understand anything pertaining to Ireland. Be the merits of the dispute what they may, it is absurd to say that the builders' action reveals "an Irish peculiarity." Of course, the fact that the new conditions are "native" had no more to say to their rejection or acceptance than green cheese has to do with the moon. Such a comment is absurd. The architects claim certain rights, and a very wide power and authority, and in our opinion rightly so. If, however, we understand the builders' case aright, it is not this which they object to, but (a) the fact alleged that they have not been consulted as to the framing of these conditions, by which they will hereafter be bound if they secure no change in their terms; (b) that the conditions of contract are involved, and more or less unsatisfactory.

As to the first objection, the letter of Mr. Orpen, Hon. Sec. of the Royal Institute of Architects, puts a somewhat different complexion on this contention, and seems to call for some explanation from the master builders, as he gives a flat contradiction to the statement that the builders were not consulted.

With regard to the second point, every lawyer we ever met condemned the old conditions in unmeasured terms for their verbose inconsistencies. Certainly, it needs no jurist to locate these, but it often requires considerable ingenuity to conjecture what is meant. It cannot be seriously contended that the new conditions make for greater brevity, simplicity, and "understandability," if we may coin an ugly word.

The Dublin builders have, moreover, in putting forward their objections, only followed in the footsteps of contractors in other towns—notably Dundee. The Dundee builders were perfectly willing to accept the English conditions, or conditions prepared by themselves and agreed to by the majority of local architects.

#### The Institute of Architects and Education.

The Council of the Royal Institute of the Architects of Ireland, the President, Mr. W. M. Mitchell, R.H.A., in the chair. There were also present—Messrs. Kaye-Parry, A. E. Murray, C. A. Owen, C. H. Ashworth, James H. Webb, H. Allberry, and R. Caulfield Orpen, Hon. Secretary. Mr. Allberry, President of the Architectural Association of Ireland, stated that his Committee desired to have an expression of opinion from the Council on the subject of the proposed education scheme which the Architectural Association had formulated, and in reference to which a deputation had

lately waited upon the Council. The Association desired to obtain some stimulus to increased energy on the part of students. The proposals put forward by Mr. Allberry were favourably received, and a committee formed, with instructions to consider and report on the best method of giving effect to them.

The proposals of the Association involved the passing of an examination as an essential condition precedent to membership of the Institute. The Association felt that so long as the present "open-door" policy prevailed, all their efforts to promote education were unavailing; that the vast majority of students would not work hard unless obliged to do so. The Association has for years past struggled on unselfishly in maintaining classes and paying instructors, with but scant appreciation as a result. It now seems to come to this—is it worth while struggling on under present conditions? An elaborate but practical curriculum was drafted by the A.A., but it was not deemed safe to expend time or money on it without some guarantee of better support on the part of the students.

#### The Competition for the Peace Palace at the Hague.\*

Mr. Alexander Koch, the editor of *Academy Architecture* and *British Competitions*, sends us an advance proof of the latter publication containing the English designs for the Peace Palace (price of the part, 3s.). The designs are by Messrs. John Belcher, A. W. S. Cross, J. Gibson and W. Walcott, Henry Hare, and Mr. Koch himself. The result of the competition has been, like so many other great architectural contests, a *fiasco*. The conditions of competition were fair enough, the competition being open, but twenty architects of various nations were specially invited to compete, and were paid 4,000 guilders each. The project was a tempting one, and many architects availed themselves of the chance. Few people acquainted with continental predilections were sanguine enough to suppose that an English design would appeal to the Dutch taste, but few anticipated such a colossal *fiasco*, for it is not too much to say that any one of the English designs was superior to that placed first, which indicates a hybrid design of the most unsatisfactory character, utterly wanting in dignity, seriousness, or the grasp of the possibilities of such a great opportunity. It was believed with some justice that of all countries France, at all events, would distinguish itself by the production of some designs of distinguished merit and stately dignity, for which the French school claims pre-eminence. The design chosen is, however, distinguished by a "wedding cake" like meretricious prettiness that may appeal to the uneducated taste; but it is inconceivable how it could have justified itself before an International architectural jury. Of all the principal countries represented on the jury England alone failed to secure a prize amongst the first six, though, as the editor remarks, it will later "be interesting to see how many of the invited competitors secured a premium."

The first prize goes to M. Condonnier, of Lille, and the second to M. Marcel, of Paris, whose design we have not yet seen. The remaining four prizes are awarded to Herr Franz Wendt, Berlin; Herr Wagner, Vienna; Messrs. H. Greenley and H. S. Olin, New York; and Herr Franz Schewechten, Berlin, in the order given.

In the publication before us, the entire five English designs are fully illustrated by perspectives and geometrical drawings, and, although very creditable, are disappointing, in that they undoubtedly fail to rise to the occasion.

Of the lot, Mr. John Belcher's is, undoubtedly, the most dignified, imposing, and comes nearest to preconceived notions of a great palace of peace and justice. It is dominated by a fine central dome, and promises restrained outlines and breadth. The general treatment is rather severe. Mr. Belcher's plan, too, is good and simple, and, at first sight, seems most suitable to the purpose of the edifice.

Mr. Henry Hare's design, of all the English contributions, is most "Frenchy"—probably due to the fact that he is an old student of the Ecole des Beaux Arts. It also is crowned by a central dome, hardly so pleasing in outline. The detail is richer and more agreeable to continental traditions and taste.

\*"British Competitions; Academy Architecture." Alex. Koch, Architect. Offices—58 Theobald's-road, London, W.C.



Mr Cross' design has points of great merit, and would, undoubtedly, be effective and imposing in execution. Its central feature is a lofty column, somewhat after the character of Nelson's Pillar, in Dublin, surmounted by a winged figure of "Peace."

Mr. Koch's own design has a great deal of dignity about it, the detail being Greek in character, and, consequently, severe. It has rather too much the effect, however, of two buildings placed one surmounting the other, to be wholly pleasing; though in certain surroundings it might prove an effective and imposing building—its great lofty facade towards the park, and almost unbroken skyline would alone ensure that.

Messrs. Gibson and Walcott's design, though original in the extreme, is too eccentric, not to say ugly, to appeal to one, and it is hard to believe it would be seriously considered. It is surmounted by a Byzantine-like dome, and in the perspective appears rather prison-like, owing principally to the extreme severity of detail.

#### Galway Granite.

The Galway Granite Company call our attention to the fact that they are in a good position to tender for all classes of granite and marble work, having opened up the fine granite quarries at Shantalla, Barna, and Ballagh, near Galway. These granites compare favourably in price, quality and variety with Aberdeen, the colours including light, medium, and dark grey and red. They are suitable for all classes of decorative work, while for paving setts they are excellent. The setts for Kinvarra Quay were supplied by this company, and they have now several other large contracts running, and are receiving enquiries daily for the supply of high-class setts. Leading geologists and engineers have testified to their superiority for the purpose of heavy traffic, and as being in their opinion one of the best on the market. The company have now in full working order splendid works, the latest machinery, and a large staff of expert sett makers and marble masons. The works cover an area of over 3,000 square yards. In addition to granite the company supply the superb black Galway marble, and "real" green Connemara marble from Recess quarries. The real green is rather difficult to obtain, as the quarries are kept busy with orders from America, but any commissions entrusted to the Galway Company are carried out in the finest variety of this uniquely beautiful marble.

#### The Pearson Case.

The big case of Pearson v. the Dublin Corporation has, as recorded in our columns, ended in a victory for the Corporation in the Court of Appeal. It will be remembered that this action was instituted by the contractors for the outfall works of the main drainage works at the Pigeon House Fort, to establish a claim to certain extras, on the grounds of certain alleged extras due to misrepresentation in the plans. At the hearing of the original action, the Chief Baron stopped the trial, and directed a verdict for the defendants, practically saying that they had no *locus standi*, as in effect they had contracted themselves out of the right to impeach the accuracy of the plans or specification by reason of the conditions which were embodied in the specification, and in which the Corporation plainly sought to indemnify themselves against such claims, saying that they had supplied the best information at their disposal, but giving no guarantees of accuracy. The actual consequence bore very hardly upon Messrs Pearson, who encountered a vast amount of apparently unanticipated trouble and expense, but these belong to the risks of contracting, and are every day suffered in silence on smaller works. On the motion for a new trial, on the grounds of misdirection by the Chief Baron, the Divisional Court by a majority (the Lord Chief Justice dissenting) ordered a new trial. From this decision, the Corporation appealed, and the Court of Appeal unanimously upheld their contention that the Lord Chief Baron was right in giving a direction to the jury. The Lord Chancellor, in his very clear judgment, gave a clear definition of what constitutes fraud, that is valuable. On the facts, it is difficult to see how the Court of Appeal could have arrived at any other decision than they did.

#### SECONDARY SCHOOLS. New Building Regulations.

The English Board of Education has issued a White-paper containing the principles to be observed in designing and fitting up secondary schools and pupil-teachers' centres, repealing or recasting the requirements set forth in the instructions issued so recently as February, 1904. Owing to the wide differences between the various grades and kinds of secondary schools and pupil-teachers' centres, the Board recognises that it is undesirable to attempt to lay down any hard and fast rules as to the actual method of planning to be adopted. Any variations from the principles suggested will be carefully considered with regard to the particular purposes for which the building is intended to serve, and will be approved, provided they can be shown to provide satisfactorily and effectively for the educational and other needs of the scholars. For this purpose the Board will be prepared to report upon and discuss with the promoters schemes for new buildings for secondary schools, while in a preliminary stage, in any case where such a course seems advisable.

The regulations refer to the general principles to be borne in mind in the planning of a secondary school, and give some guiding suggestions with regard to the general space measurement for each scholar. The rooms should be grouped compactly and conveniently, in order to secure easy and effective supervision, and economy in working and maintenance. Generally speaking, in the case of schools where the number of scholars is considerable, this result can most satisfactorily be secured by placing the classrooms on three sides of, and opening from, a central hall. In the case, however, of small schools and those in which the hall is made to serve for a variety of purposes, it is often found more convenient to separate the classrooms from the hall, in order to avoid disturbance. Where more than one floor is necessary, the upper rooms can be entered from a gallery, which should be in full view of the hall. As far as possible, passages and corridors should be avoided; if used, they must be large, airy, and well lighted. The classrooms should have the upper panels of the doors glazed with clear glass, in order to facilitate inspection without disturbing the work in the room. The accommodation of a room depends not merely on its area, but also on the lighting, position of the doors, fireplaces, and the general shape of the room. The assembly hall should provide 6 sq. ft. floor space per scholar, and in the case of schools of less than 150 scholars, 8 sq. ft. of floor space should be allowed. No classroom should be designed for less than fifteen or more than thirty scholars; and there should be four classrooms for every hundred scholars. A lecture room should not accommodate less than thirty scholars, with 14 sq. ft. floor space each for the first thirty scholars, and 12 sq. ft. per scholar for all above that number. Every school should be provided with one or more laboratories, an art room, workshops, a gymnasium, a proper dining hall for day scholars as well as for boarders, and common rooms for masters and scholars for use out of school hours. Libraries and infirmaries are mentioned as essentials to every boarding-school; and in boarding-schools for more than eighty boarders it is suggested that there should be separate boarding-houses for not more than fifty in each house, under the charge of a master.

Before recognising newly-erected premises as suitable for a secondary school, the Board must be satisfied, by the submission of plans drawn in accordance with prescribed requirements, that the building regulations are complied with. The promoters of schools must, however, take their own measures to secure that their plans are in order under any bye-laws which may be in force in the district in which the school is situated. All plans, whether for new buildings or for improvements in existing buildings, must be submitted in accordance with the following requirements:— (1) A block plan of the site, drawn in ink to a scale of 20 ft. to an inch. (2) A plan of each floor of the schoolrooms (and teacher's or caretaker's house, if any) drawn in ink to a scale of 8 ft. to an inch. In cases of enlargement, a plan showing the buildings as they exist is needed. (3) Sections and at least four elevations, also drawn in ink to a scale of 8 ft. to an inch. The ceiling, the positions of window-heads in relation thereto, and the mode of ventilation must be shown. (4) A concise description of the buildings, and of the various rooms, with their dimensions and uses. The total number of scholars of each sex for whom accommodation is proposed to be provided must be stated. (5) In the case of alterations, adaptations, or additions, the proposed accommodation must be clearly shown. (6) A draft specification. (7) An estimate of the total expenditure proposed.

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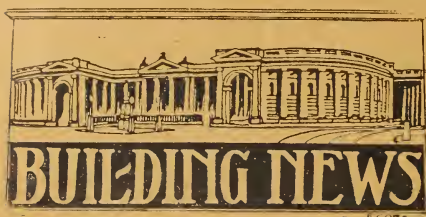
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**Athlone.**—The Urban District Council of Athlone received tenders for the erection of a market house at the Market Square, and also for the erection of a store at the Waterworks, according to the plans and specification of their surveyor, Mr. P. J. Prendergast, A.M.I.C.E., Northgate-street.

**Belfast.**—An interesting lecture was delivered recently at the new building in course of erection for Messrs. John Wallis and Sons, in Great George's-street, Belfast, the subject being the construction of fireproof buildings in ferro concrete by Hennebique's principle. At the invitation of Mr. Mouchel, engineer-in-chief in Great Britain for the patentees, and attracted also by the remarkable nature of the process, a large and representative gathering of civil engineers, architects, mill-owners, builders, and others interested in the perfection of building construction attended. On arrival, the visitors were received by Mr. W. W. Kennedy, manager for Messrs. John Wallis and Sons, and Mr. R. A. Boyd, C.E., architect for the building. In the absence of Mr. Mouchel, who was unfortunately indisposed, Mr. Devisian, C.E., conducted the visitors over the building, and pointed out the peculiar nature of the new construction, which almost spells a revolution in the erection of buildings of this class. The visitors were much struck by the simplicity, strength, and perfectly fireproof qualities of the Hennebique principle. Afterwards Mr. Devisian delivered a lecture, illustrated by limelight views, by means of which he pointed out in detail the salient points of this method, and also showed views of buildings erected in all parts of the world under this patent. These went to show the very extended uses to which the process can be applied, and the almost unlimited scope of its utility. At the close a hearty vote of thanks was passed to the lecturer. The building, when completed, is to form the headquarters in Belfast of Messrs. John Wallis and Sons, general carriers and warehousemen, and contains all modern requirements for carrying on an extensive business of this class. The whole of the work was carried out by the Yorkshire Hennebique Contracting Company, Ltd.

**COUNTY BOROUGH OF BELFAST.**—The Public Health Committee invite tenders for the erection of workmen's cottages on the Milltown road, Purdysburn, in accordance with the plans and specifications of Messrs. Young and Mackenzie, architects, Scottish Provident Buildings. Tenders to be lodged the 5th July.

**Ballygriffin (Co. Tipperary).**—The Ballygriffin Creamery Company received tenders for the building of a creamery at Ballygriffin. Mr. D. McKinley, B.E., is the architect.

**Cork.**—Tenders for the enlargement of the gate lodge, Queen's College, Cork, will be received on the 5th of July by H. Williams, secretary, Office of Public Works, Dublin.

**Celbridge.**—The Board of Guardians of this Union received tenders for carrying out certain repairs and improvements at the Rathcoole Dispensary residence, in accordance with a plan and specification prepared by Mr. J. J. Inglis, C.E., 18 Nassau-street, Dublin.

**Deansgrange.**—The Deansgrange Joint Burial Board invite tenders for vestry and heating arrangements to Mortuary Chapel in Deansgrange Cemetery, Monkstown, Co. Dublin. Tenders to be delivered on 6th July.

**Dublin.**—The new Church of St. Agatha, North William-street, will be in the Classic style of architecture, comprising nave, sanctuary, two sacristies, porches and baptistry, and gallery. The entire length of church, including sanctuary, is 154 feet, the width 47 feet, and the height 52 feet from floor to ceiling. The nave will be divided into bays by pillars and arcading, having richly ornamented caps and moulded bases. The sanctuary will be semi-circular, and will also be divided into bays similar to the nave. The ceiling of nave and sanctuary will be coved and divided into panels richly ornamented. The front of the church is to be executed in limestone, having deeply moulded pediment, with pedestals and statues, and deeply moulded and enriched cornice. The rest of the building will be executed in black stone. The dressings of windows and doors will be in limestone. The contract has been given to Mr. James Kiernan, 100 Talbot-street, Dublin, and the work will be carried out from the designs and under the superintendence of Messrs. William H. Byrne and Son, Architects, 20 Suffolk-street, Dublin.

**Garristown.**—On Sunday last the new church at Garristown was dedicated by His Grace the Archbishop of Dublin. The edifice was erected by Mr. James M'Adorey, builder, Dundalk, from the designs and under the superintendence of Mr. George L. O'Connor, M.R.I.A., Great Brunswick-street, Dublin. The statues in the niches at each side of the altar were presented by Mrs. Augier. They are admirably designed and beautifully executed. The gates of the altar rails were supplied by Messrs. M'Loughlin, Great Brunswick-street.

**Kilkenny.**—KILKENNY UNION.—The Board of Guardians of above received tenders for the re-celling of the Workhouse Roman Catholic Chapel.

Tenders will be received on July 2nd by Kilkenny Corporation for repairs to house situate at Michael-street.

**Limerick.**—The Limerick Artizans' Dwellings Company are about to raise further capital for the purpose of building additional houses in the city.

**Omagh.**—At a meeting of Omagh Urban Council, plans were submitted for the proposed County Club to be erected in High-street. Mr. J. Moran, town surveyor, stated that the bye-laws had been complied with, and the plans were approved of.

**Queenstown.**—Tenders are invited for the erection and completion of a new side chapel and sacristies, etc., in connection with St. Colman's Cathedral Queenstown, for the Most Rev. R. Browne, D.D., Lord Bishop of Cloyne, according to the plans and specification prepared by Ashlin and Coleman, architects, 7 Dawson street, Dublin. Tenders close on 10th July.

The Cork Port Sanitary Authority invite tenders for the erection of a morgue at Queenstown, in accordance with plan and specification, which may be inspected at the office of John Ahern, Esq., Town Surveyor, Queenstown. Tenders will be received up to 4th July.

The Cork Port Sanitary Authority also invite tenders for repairs to the intercepting hospital, Queenstown. Tenders will be received up to the 4th July.

**Rathdown (Co. Dublin).**—The Board of Guardians of the above Union will, on the 4th July, receive tenders for fitting up water closets and urinals at the workhouse.

**Wicklow.**—The County Wicklow Joint Technical Instruction Committee received tenders for the painting of the exterior of the Technical Schools, Wicklow; also for plastering, tiling, and other small works.

**Waterside.**—Tenders will be received for the erection of stables, stores, and other improvements to premises, Duke-street, Waterside, for Messrs. Alexander Thompson and Co. Mr. Daniel Conroy is the Architect, 21 Shipquay-street.

**Warrenpoint.**—WARRENPOINT DISPENSARY.—It has been decided to get the Board's architect to prepare a specification for the fitting up of the new dispensary premises in Warrenpoint, and to advertise for tenders for carrying out the work.

**Waterford.**—The Board of Guardians will, on the 4th prox., elect, at a salary of £50 per annum, a competent person as Clerk of Works to superintend the erection, alteration, or repair of any buildings at the Workhouse or Fever Hospital premises as may be required by the Board.

#### TENDERS.

**Rathdown R.D.C. No. 1.**—For tiling kitchen floors of twelve cottages near Dundrum with Woolliscroft's heavy fire-clay, 6 in. x 6 in. tiles.—No. 1 (O'Hara, Dublin), £57; No. 2 (Kelly, Kings-town), £54; No. 3, £55 10s.; No. 4 (J. P. Richardson, Dundrum), £54 (accepted); No. 5 £56 10s.

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# ENGINEERING SECTION.

## ITEMS.

The American Bridge Company, nationally characteristic, is going to erect the largest single factory building in the world, the plans being at present in the hands of their engineers. The one building will, on one floor, have an area of over one million square feet, being 1,560 feet long and more than 600 feet wide. Four 15-ton electric travelling cranes will run the entire length of the building. The cost of the structure is estimated at £400,000.

The Telegraph Instrument Room at the General Post Office, Dublin, which extends for a width of forty feet, practically along the whole of the upper floor on the main front, has recently been installed with electric light on the three phase system. The room was originally lit by Wenham lamps, but it was found that the heat generated was somewhat excessive, and that light so distributed was not the best possible for the ever-increasing work of the staff. The new installation consists of nearly 200 16 c.p. lamps, or practically one to each operator, and after a lengthy trial has been found to be entirely satisfactory. The work was executed by Messrs. Wm. Coates and Son, Ltd., of Belfast and Dublin, to the specification and under the supervision of Dr. Cochrane, F.R.I.B.A., principal surveyor to the Office of Public Works.

By the time these notes are in print the annual congress of the Royal Institute of Public Health, to be held this year in Cork, will be in full swing, and, judging by the programme we have received, the proceedings should prove highly interesting and instructive. For the business proper of the congress, the Queen's College has been placed at the disposal of the Reception Committee by the College Council, as might be expected under the circumstances, Professor Bertram Windle having been elected President of the congress. The principal subjects to be dealt with are divided into five sections—(a) Preventive medicine; (b) child study and school hygiene; (c) engineering and architecture; (d) bacteriology and chemistry, and (e) veterinary hygiene, in all of which a fair number of useful papers has been secured. As may be anticipated, the traditional hospitality of the Southern capital has been freely extended to the congress, and while business meetings will be held from 10 a.m. to 1 p.m. and from 2 p.m. to 4 p.m. each day, the delegates will find that the remainder of their time has been well filled up with garden and dinner parties, steamer trips, band promenades, and trips to Killarney, Glengariffe, and Lismore, the scenery of which will doubtless be much appreciated by the English visitors. The Duke of Devonshire has also issued invitations for a luncheon party at Lismore.

It is to be greatly regretted that extreme difficulty was experienced by the hon. secretaries in developing the engineering and architectural section. We hear so much of Irish architects and engineers being overlooked by their compatriots in favour of their British *confères* that one would think the separate institutions would have strained every nerve to make their section a success, and that efforts would have been made to ensure a valuable contribution of papers on the many important subjects in which architects, engineers, and the general public are interested. Owing to some confusion, neither the Institution of Civil Engineers or the Royal Institute of Architects of Ireland appear to have interested themselves to any extent in the congress, and it is the President of the Architectural Association of Ireland who has the honour of presiding over the joint section. In the hands of Mr. Joseph Holloway it will certainly not suffer, and the A.A.I. is to be congratulated on the professional spirit which actuates its members and which has, at the last moment, relieved the sore-taxed hon. secs. of a source of anxiety.

It is sincerely to be hoped that before long some system of examination and registration of electrical wiremen will be evolved by someone of the Electrical Associations. The term "registered plumber" is now one of general use, and is acknowledged to carry with it a certain degree of efficiency. Owing to the enormous expansion of electrical business, there are numbers of men engaged on this important work who are incapable, either from want of knowledge or lack of application, and often at the close of a contract an installation has to be partly renewed owing to defects arising out of utter ignorance or carelessness on the part of some of the wiremen engaged. The work, if properly executed, requires so much acumen and skill, that a standard of qualification is quite as necessary in the electrical as in the plumbing trade, and the eradication of the unfit from the ranks of the wiremen would tend to elevate their status and reassure the public, which still remains timorous of the power of electricity. The course suggested has already been adopted in Sydney, where the City Council has framed bye-laws providing that wiremen must obtain licences from the city electric engineer. Evidence is required of good character, and that two years have been served in the wiring trade. The licence is issued by the Town Clerk upon receiving the application, proof, particulars, and a fee of 5s., provided that the applicant is over 21 years of age. The licence thus granted is subject to annual renewal at a cost of 1s., and may be cancelled in the event of the holder executing defective or inferior work. Such a course is calculated to protect the client and the engineer, and, at the same time, adds, in a small way, to the city revenue.

Engineers will doubtless be interested in the action of the Royal Institute of Architects, Ireland, which body is about to memorialise the Chief Secretary and all the Irish members with regard to the Labourers' Bill. The action is based upon a statement made by the Chief Secretary that the Local Government Board would issue lithographed plans of cottages for the use of the various Councils. The architects naturally feel that such type cottages could not be universally adaptable, owing to differences of site, aspect, surroundings, and local materials, and that their issue broadcast would interfere to some extent with professional practice throughout the country. While plans are prepared as at present, in so many instances by utterly unqualified men, who have more title to be called stonemasons than architects or engineers, it would appear that plans issued by a Government Department prepared by fully qualified men would be an improvement, as Councils generally turn to the cheapest market for designs, and would assuredly build to the Local Government Board designs, obtainable free, for the same reason that they now employ ignorant persons, whose fees (really dear at any price) are but a fraction of those sought by trained professional men. It is understood, however, that the Institute will also address itself to the larger issue, and will endeavour to lay before the Government the undesirability of any but qualified men being employed as architects and engineers to the various public bodies in Ireland. Without being unduly pessimistic, we fear the idea is somewhat chimerical, in the present state of affairs. If asked what standard really constitutes a "qualified" architect or engineer, we fear the Institute would be at a loss for a reply. Until registration is *un fait accompli*, standards vary with the individual, and it can scarcely be expected that the Government can be induced to consider a point upon which the members of the profession are in complete antagonism.

But we look on the Institute's action with every approval, not in the light of the probable result, but because it denotes activity. Once the broad question is raised, it will not be allowed to drop, and another argument in favour of registration will be obtained, which will assuredly commend itself generally.



According to *Electricity*, the direct production of cold by means of electric current is a problem that engineers are considering. Something may be done by connecting a motor to an air compressor and expanding the compressed air into a cold storage chamber, but this is a costly and cumbersome method. We may expect the electro-chemist to refrigerate by energy from the electric supply mains, through some such direct means as a reversed battery abstracting heat from air. In this connection it is worthy of note that the well-known action of the thermo-couple is reversible, and that the current passed through it in a certain direction produces cooling of the junction. The solution of the problem for refrigerating purposes would be of great utility from domestic and hygienic points of view.



#### ARCHITECTURAL ASSOCIATION OF IRELAND. JOTTINGS.

The new committee has held its first meetings, and the work of the tenth session has seriously commenced. The committee, as now constituted, is a very strong one, and although four members who have worked hard for the A.A.I. since its resurrection did not stand for re-election, the new comers, Messrs. Burke, Dickenson, Geoghegan, and O'Connor, will doubtless vitalise the proceedings. Each of them has shown the keenest interest in A.A. work, and they will now be in such a position that their energy and advice will be more beneficial.

At a recent meeting of the Macroom Union, the appointment of an engineer to the Board of Guardians and District Council was under consideration. Three applications were received, one from Mr. Bernard, a fully qualified engineer, and a member of the Institution of Civil Engineers, Ireland. The second was Mr. Murphy, whose testimonials pointed to a varied engineering experience, and who is an Associate Member of the Institute of Civil Engineers. The third was from Mr. Patrick Coughlan, whose qualification consisted of the fact that "he was the son of a very old resident in the town of Macroom, a man of large experience in the building trade." The applicant had three years' attendance at the technical class and one year at the Cork School of Art, and held certificates for building construction, levelling, surveying, mapping, etc. There was a long discussion as to whether the appointment should be liable to three months' termination, and subsequently the latter applicant was unanimously elected. It is interesting to note that the salary attached to the post is £20 per annum!

The first public function of the new President, Mr. Joseph Holloway, will be to preside over the architectural and engineering section of the Congress of the Royal Institute of Public Health, which is to be held at the end of June in Cork. It is indeed an honour to the A.A.I. to be represented in such a manner at the proceedings, and the President, in accepting the post, will well represent the Irish architectural profession. The Corkonians have extended the warmest hospitality to the congress, so our President will find time heavy on his hands when the serious part of the day is over.

The long spell of dry weather and the ever-increasing number of motors on the public highways are combining to again turn general attention to the "dust nuisance." There is no question that some steps will have to be done, and done quickly, to abate the grave inconvenience suffered by pedestrians and householders along the more important suburban arteries, and those who have charge of the roads will have to belatedly make up their minds to acknowledge that motor traffic has arrived and has come to stay, and that the conditions set up by new circumstances will have to be met. He who, feeling especially spick and span, in, say a dark blue suit, has been overtaken by a fast travelling car, and, having groped vainly about for some time in a thick fog of limestone dust, has emerged therefrom like a miller, can well appreciate the urgency of the problem from the public point of view. But even the much-abused owner also has his drive spoiled when he feels, travels he ever so carefully, that he leaves a miniature dust-storm behind him, and that each person he passes utters a malevolent wish for a bad end for both him and his car. In Switzerland the evil is being grappled with thoroughly. The Anti-Dust League has had under trial three preventives, oiling, watering with deliquescent salts, and tarring. The tar method has been found to be the most efficacious, a result similarly arrived at by the French Government, after a four years' trial. The necessary expenditure of from 2½c. to 3c. per square yard is considered to be fully justified. It is perhaps scarcely to be hoped in these islands, where even occasionally watering the roads seems by public authorities to be quite a favour to the public, that any new departure may be expected for some time. But the increase of the dust evil will in time, by force of public opinion, bring its own mitigation.

It is whispered that one of the first matters considered by the new committee was whether the results of the classes justified the large expenditure on fees and prizes. It is quite possible the money could be put to uses which would be of more general benefit to the members, but, as the matter is still *sub judice*, criticism of any kind must be withheld.

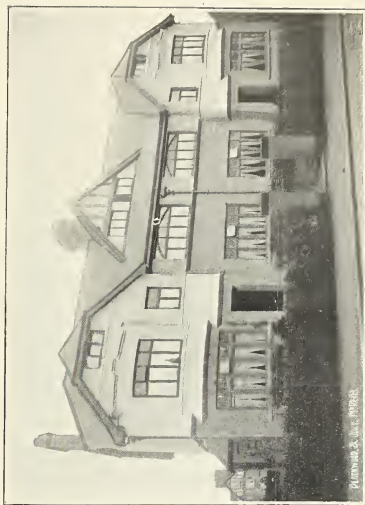
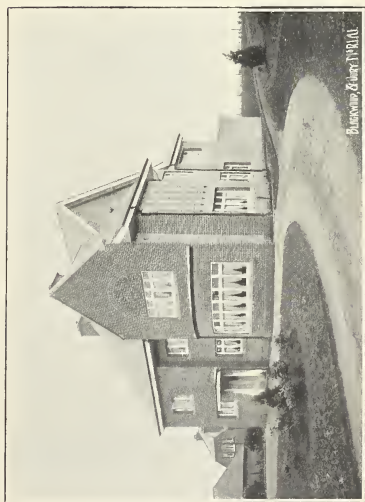
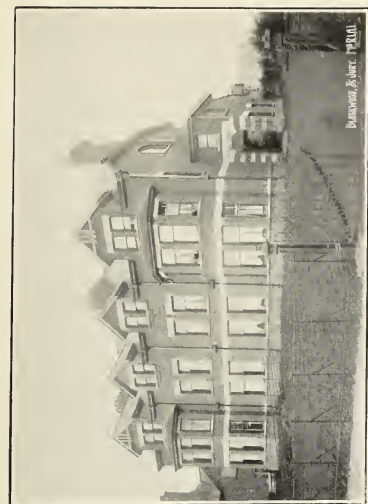
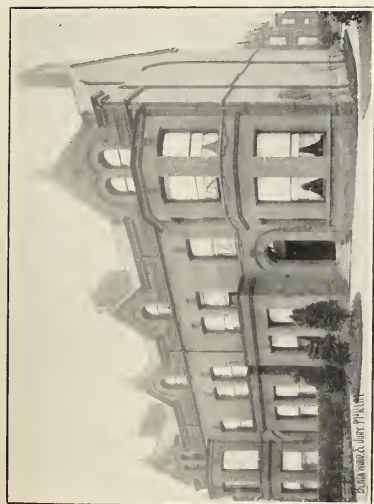
The excursion programme has just been issued, and if promises are fulfilled, the function should be one of the best that has yet been held. Departing from usual custom, the date of the excursion has been fixed for Tuesday night, July 10th, to Sunday morning, July 15th, when those members who do not wish to avail themselves fully of the eight day return ticket will arrive in Dublin saturated with architectural knowledge, gleaned from possibly the most interesting centre in England. The headquarters will be at Kettering, Northamptonshire, and drives will be made to Kirby Hall, Hyham Ferrers, Rushden, Irthlingboro', Earls Barton, etc. We choose the above for mention out of a long list, because they are of much importance to architectural students. The cost of the four days' excursion from Dublin and back, including travelling expenses, full board, and two-and-a-half days' waggone driving, is £3 7s. 6d., a figure that makes one pause and wonder if it would not actually be more economical to do the trip than to stay in town. The organiser of the excursion, Mr. Bradbury, is to be congratulated on the result of his efforts. It now lies with members to show their appreciation of the trouble he has taken by sending in their names—and their cheques.

"WEE MACGREGOR."

#### PHOTO-PRINTS BY ELECTRIC LIGHT.

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Enormous quantities of cement are now being sent to San Francisco for the rebuilding of that city, and a demand is also setting in for slates. During the next twelve months great quantities of slates are likely to be required, and already there is an inquiry for a 5,000-ton steamer to take out a cargo to be loaded at Cornwall in June or July.



Some villa residences recently erected in Belfast to the designs of Messrs. Blackwood and Jury, Architects, Belfast



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## A REMARKABLE FERRO-CONCRETE BUILDING.

The new goods station and warehouse for the North Eastern Railway Co., at Newcastle, which has almost been completed, ranks amongst the most important Ferro-Concrete contracts that have been carried out in the United

Kingdom, and is a remarkable illustration of the possibilities and advantages to be gained by using reinforced concrete for buildings on a large scale. The building, which has been carried out on the Hennebique Patent Ferro-concrete system, of which, as our readers are aware, several examples are already to be seen in Ireland, has been designed and erected under the supervision of Mr. W. Bell, F.R.I.B.A., the chief architect to the North-Eastern Railway Co. The entire contract for cement was placed with Messrs. I. C. Johnson and Co., Ltd., of Gateshead and London, and some idea of the magnitude of the work may be gained when we mention that this firm supplied cement for more than 20,000 cubic yards of concrete. The principal

regular intervals of 33 feet. These spans, the outer ones measuring 37 feet 2 inches and the inner ones 52 feet from centre to centre, constitute an important feature of the building, and are stated to be the longest span concrete-steel girders ever erected in the United Kingdom, and are necessary to avoid interference as much as possible when dealing with traffic. The strain on the beams is enormous. The floor is equal to bearing a dead load of 336 pounds per square inch, in addition to the moving load of railway waggons, but, as will be noticed from the tests, of which the following is an abstract, the deflection of floor and beams has been very trivial, the return to the normal beginning as soon as unloading was commenced, thus proving the elasticity of the building, and its suitability for the purpose for which it was designed.

#### TESTS OF TWO MAIN BEAMS OF GROUND FLOOR OF N.E.R. GOODS WAREHOUSE, CONSTRUCTED IN HENNEBIQUE'S PATENT FERRO-CONCRETE.

The tests took place on the 30th and 31st March, 1905, under the supervision of Mr. A. Pollard, representing the architect, Mr. W. Bell, F.R.I.B.A., and Mr. T. J. Gueritte, C.E., B.Sc., district engineer for Hennebique Ferro-concrete constructions.

1st test, main beam No. 3, span 27 feet 9 inches.—The total area of floor tested was 27 feet 9 inches by 32 feet 9 inches, or 909 square feet. The normal superload for which the floor is calculated is 3 cwt. per square foot, making a total load of 136 tons on the beam tested. The test load specified was 50 per cent. in advance of the normal load, that is to say, 205 tons. In the actual process of loading, this figure was, however, exceeded, the total load on the beam amounting to 207 tons.

In order to ascertain the deflections of the beam tested, three indicators of deflection were used, these instruments enabling a deflection equal to the 500th part of an inch to be detected. Under the full load of 207 tons, the maximum of deflection recorded was slightly over  $\frac{1}{8}$ th of an inch, as compared with the deflection allowed per contract, viz., nine-sixteenths of an inch. As soon as the process of unloading was commenced, the beam began to spring up to its original position.

2nd test, main beam No. 1, span 34 feet 10 inches.—The total area of floor tested was 34 feet 10 inches by 32 feet 9 inches. The normal superload for which the floor is calculated is 3 cwt. per square foot, making a total load of 171 tons on the beam tested. The test load specified was 50 per cent. in advance of the normal load, that is to say, 256 tons. In the actual process of loading this figure was, however, exceeded, the total load on the beam amounting to 273 tons.

As in the first test, three indicators of deflection were used, and under the full load of 273 tons the maximum of



A Spiral Staircase built on the Hennebique principle.

dimensions of the building are:—Length, 430 feet; breadth, 178 feet 4 inches, and height, from basement floor to top of parapet, 83 feet 4 inches. The basement will be used as a low level goods station, with four train tracks. The ground floor will be used as a high level goods station, with six railway sidings, the rails being embedded in the floor. The remaining two floors will be used for storage purposes. In the basement are the main columns supporting the building, the foundation slabs for these columns, in the centre of the building, being 15 feet 6 inches square, and those at the outer 14 feet square at the bases, spreading the weight at the rate of five tons per square foot over the ground, which consists of boulder clay. Two smaller bases are placed on each side of the centre one, 7 feet square, while the inner faces of the massive concrete foundations on which the wall columns rest form the side and end walls of the low level station.

A noticeable feature of the ground floor, on which, as we have already mentioned, six railway sidings are laid, is the thinness of the floor surface—only 6 inches. This is the more remarkable when it is borne in mind that six heavy goods trains may be on the floor at one time, not to mention the vibratory strain consequent on the working of heavy cranes, turntables, etc., working on the same floor.

This floor is carried entirely on the reinforced concrete columns already referred to, which columns are continued upwards for the support of the girders spanning the entire building at



View of the Ground Floor of the New Warehouse.



deflection recorded was slightly over five-sixteenth of an inch, as compared with the deflection allowed per contract, viz., eleven-sixteenths of an inch. When unloaded the beam resumed its original position, the permanent set recorded being only one-fortieth of an inch.

A close examination of the two beams tested failed to show any sign of deterioration, and the tests were, therefore, considered highly satisfactory.

A further remarkable feature of the building is that the walls throughout are only 4 inches thick, and unlike usual brick or stone buildings, the wrought iron girder is entirely absent.

It is claimed for Ferro-concrete constructions that the steel bars embedded in the moulded cement will stand the most intense heat, and that fire will have little effect on beams and columns constructed in this manner. The various floors in the building will be utilised as follows—The basement, having a floor area of about 75,000 square feet, will be partly utilised for the storage of fruit and vegetables, and access to the floor is given to lorries and carts by means of a specially constructed subway. Railway trucks will be lowered to this floor by means of electric hoists. The ground floor, which will be used as a high level goods station, will provide accommodation for about 120 waggons inside the building; the area of the floor being similar to that of the basement. Overhead travelling cranes, hydraulic and other cranes and capstans, will be fitted throughout the floor, affording the most ample means for the rapid handling of goods traffic. The remaining floors, having an area of about 140,000 square feet, will be devoted to the storing of grain in special bins, grain in sacks, etc. The roof on which the cantilevers rest is flat, and can be utilised for the storage of imperishable materials.

When the building is completed and faced with smooth cement, its appearance will differ very little from the ordinary dressed, close-grained stone structure.

One of our illustrations is taken from a photograph of the ground floor goods station. The other, which is also of considerable interest, shows a spiral staircase, constructed of similar material to that used in the building.

It will not be out of place to add that one of the most important features contributing to a reliable structure, constructed on this system, is the quality of cement used, and the fact that Messrs. Johnson's cement has been used on this important contract is a tribute to the excellence of their cement. To their Irish representatives, Messrs. MacNaughton and Co., of Dublin, Belfast, and Cork, we are indebted for the information contained in the above article.

#### Cologne Cathedral

The news that Cologne Cathedral is in serious danger is of much more than local or even national interest. The great church is by far the largest Gothic building in the world. It was constructed from the plans of one architect, who must have been a supreme genius, but whose name is unknown, though his plans, made over seven hundred years ago, are still in existence, and are shown to visitors.

With regard to this, a curious legend is told, and is still believed by the superstitious in Cologne. It is said that the architect, desiring to build the grandest cathedral in the world, called in the aid of the devil—a rather strange collaborator in such a work—and sold his soul to him in return for the plans. Repenting of his bargain, he was relieved by the Church, but the devil, unable to recover the plans, revenged himself by promising that the name of the architect should never be known, and the cathedral never be finished. As a matter of fact, though begun in 1248, it was not finished until 1880, and in the present necessity for restoration the superstitious will probably see a fresh fulfilment of the Satanic threat.

The Leyton Council have accepted the tender of Messrs. Helliwell and Co., Ltd., of Brighouse, Yorkshire, for the patent glazing required to their new car sheds, the glazing to be on their "Perfection" system. The same company have also in hand the patent glazing for the extensions to the power station.

#### REVIEWS OF CATALOGUES.

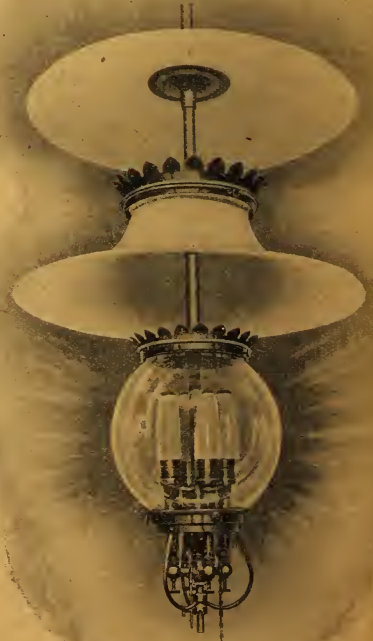
We are in receipt of four catalogues from the **Clydesdale Iron Foundry Co.**, 210 Upper Thames-street, and they are as fine specimens of illustrated catalogue work as we have seen. The first of them is devoted to Mantle Registers, Tile Registers, Interiors and Chimney pieces, of all of which a great variety of most artistic designs are shown, the prices for the quality of work and ornamentation being extremely moderate.

No. 2 catalogue deals with sanitary fittings, which are also illustrated in great variety. They include baths, lavatory stands and basins, closets, etc., as well as fittings.

No. 3 catalogue describes and illustrates the ranges, fixed and portable, stoves and other heating and cooking apparatus made by the firm. These are sufficiently varied to meet all requirements, and are listed at a wide variety of prices.

In No. 4 catalogue are illustrated rain water goods, heads, gutters, and similar cast-iron work. In this section cast-iron sanitary pipes and connections are also treated of. The Clydesdale Company, in addition to the wide range of goods appearing in their catalogues, make a speciality of catering for all kinds of iron castings.

Mr. William Edgar, Blenheim Works, Hammersmith, London, W., sends a very neat and well illustrated catalogue describing his "Eclipse" Incandescent Gas Lamp, one of the indoor patterns of which we illustrate. The lamp, as will be observed, is elegant in design, and it is also dust,



insect, and wind proof, and requires no chimney. The globe can be lowered for remanting by pressing a lever, and is easily detached by turning a thumb screw. This lamp, both for outdoor and indoor lighting, has superseded electricity in many places in London and other parts of England, as it gives a magnificent light, and is, of course, far cheaper than the electric arc lamp, which it resembles in appearance. Mr. Edgar is prepared to send a sample lamp to any address for testing and approval free of charge.

"Vitalith" and "Segalith" are the names of two useful compositions, particulars of which are sent us by the makers, **Messrs. J. and H. Patteson**, Oxford-street, Manchester. Vitalith is a jointless composition wall covering, which is a combination of marble and other mineral substances united in one homogeneous mass by a special cement. It is fixed in a plastic state to any kind of wall or ceiling, curved or straight, and solidifies within 36 hours with a glass-like surface. It is claimed for it that it will not shrink, crack, craze or discolour. It can be fixed in any plain or marble colouring, and may be treated with border or other ornamentation. Being non-absorbent, and with a glazed, jointless surface, it forms a sanitary as well as artistic wall covering, and is inexpensive.

Segalith is also a jointless composition made up with a special cement, and is used for flooring. It can be laid down on any kind of floor, new or old and worn. Like Vitalith, it is applied in a plastic state and solidifies within 36 hours. It may be waxed or polished, or left as laid, and can be had in any plain colour or treated as a marble mosaic with borders and other ornamentations. Full particulars, estimates and designs, can be had on application to the above address, or from the London office and showroom; 7 Bayley-street, Bedford Square, W.C.

**Mr. Percy Pitman**, of Bosbury, Ledbury, sends us particulars of his "Pelton" water wheels and "Hector" water motors. The "Pelton" water wheel consists of a solid wheel with buckets on the periphery. It is enclosed in a chamber, into which water is admitted by an inlet pipe, the liquid after entering being divided into three streams by three nozzles playing on the wheel. The quantity of water flowing through any of the nozzles is governed by three hand-operated valves and an automatic governor of the centrifugal type is also fitted. These water wheels are very useful for working with electric generators, which may be directly coupled to them. They are made of various powers, the 50 h.p. type running at 135 revolutions when consuming 700 cubic feet of water per minute at a head of 50 feet.

The "Hector" water motors are designed for driving every description of small machinery, and are made in sizes from  $\frac{1}{8}$  to  $2\frac{1}{2}$  h.p. They work with the ordinary domestic water supply, or any water under pressure. They are silent and clean, occupy little space, and are easily fixed, thus forming very useful domestic motors. They are fitted with improved tangential water wheels, and are enclosed in cast-iron cases with removable cover. The wearing surfaces are large and of phosphor bronze. A useful application of this motor is its combination, with direct coupling, with a small dynamo for charging accumulators. It will charge two motor car, or four motor bicycle accumulators.

**Messrs. A. Ransome and Co., Ltd.**, Newark-on-Trent, submit their general illustrated catalogue (copyright) of woodworking machinery. This firm is one of the best known and most extensive of its kind in England, and the growth of its business in recent years has been remarkable. Prior to 1900, their works were at Chelsea, with a foundry at Battersea, but these proving insufficient to meet the increased demand for their machinery, they, in that year, removed both their London businesses to Newark-on-Trent. Here they have erected an extensive factory on a site of ten acres, adjoining the Great Northern Railway, two sidings of which run into the works. The new works as at present built will accommodate 1,000 workmen, but are so arranged that each department can be doubled when the exigencies of the business require it. All the workshops are built on the ground floor and are fitted up with the latest labour-saving machine tools and with every modern device for economising labour and cheapening production. In order to still further cope with their steadily-growing trade, Messrs. Ransome have, during the past few months, made considerable additions to this plant, and they are thus enabled in many instances to make substantial reductions in their prices. The catalogue, which is copiously illustrated, deals with every conceivable variety of woodworking machine, the number of different tools being so great that it would be impossible in the space at our disposal even to enumerate them. They embody, however, all the most recent improvements, several of which are of Messrs. Ransome's own invention. It has always been the practice of

this firm to keep their machines thoroughly up-to-date, and with this great object in view they have recently entirely re-designed and greatly improved a large number of their machines. This, combined with the installation of new plant, places them in a position to offer better machines at a considerably lower price than heretofore, while maintaining their well-known excellence of workmanship. The catalogue is one which should be in the hands of all sawmill owners, builders, and others interested in woodworking.

Porcela is the name of a preparation, the English agents for which are the **Standard Sanitary Manufacturing Co.**, 22 Holborn Viaduct, London, E.C. It is an American invention, and is made for cleaning and polishing porcelain enamelled baths, lavatories, closets, sinks, and other plumbing fixtures. It is also recommended for cleaning enamelled cooking utensils and kitchen ware, and is said to be an excellent polish for nickel brass and silver.

The "Grey Royal" Granite Setts Co., Ltd., 16 Water-lane, Great Tower-street, London, E.C., send us a pamphlet dealing with their granite setts. The stone of which these setts are made is a fine granite which lends itself to accurate dressing, and is claimed to be hard, tough, and non-slipping. The special feature, however, of the setts is their form. The stones are all of the same shape and thickness, dressed true, and with square arrises. Being uniform in depth they do not require thick sand bedding, and eliminate the tendency to inequality in wear and surface, and their regular shape enables them to be laid as closely as bricks. Open joints are thus done away with, and with them a great fault in sett paving. With the usual open joint the arrises get broken down, and a "ridge and furrow" surface is formed. This is the main cause of noise, while mud and dust accumulate in the hollows from which their removal is difficult when sweeping. It is often contended that for the purpose of horse foothold wide joints are necessary, but this is not the case provided the material itself is not slippery. Given, therefore, a gritty granite, not liable to polish, a closely laid well-dressed surface should produce a roadway much superior to ordinary granite paving. The cost of such setts, owing to the workmanship in dressing, would, of course, be greater than that of the ordinary irregular stone, but, on the other hand, the regular depth increases the covering capacity per ton, and thus reduces the total cost of paving a given area.

## IMPORTS

### PORT OF DUBLIN

June 13, per Glenariff, from Middlesbrough, 313 tons cement, J. P. Corry; per Britannia, from Cowes, 80 tons cement, W. Chadwick.

June 14, per City of Stockholm, from Rotterdam and Antwerp, 9 cases tiles, to order; per Val de Travers, from Treport, 100 bags plaster, to order; per Glen Head, from Riga, 1 quantity lathwood, 26,672 pieces firwood, sawn, to order; per Camelia, from Bridgewater, 160 tons bricks, etc., T. and C. Martin, Ltd.

June 15, per City of Belfast, from Hamburg, 50 tons asphalt, J. Reinhardt and Son, Ltd.

June 16, per Exchange, from Shoreham, 250 tons cement, W. Richardson.

June 19, per Pydua, from West Bay, N.S., 99,485 pieces deals, battens, scantlings and ends, R. Martin and Co.; per Faithful, from Rochester, 210 tons cement, Betson and Co.; per Progress, from Bridgewater, 90 tons brickyard goods, J. M'Ferran and Co.; per Lady Wolsley, from London, 600 sacks cement, S. H. Bolton and Sons; 410 do., do., to order; per Lady Hudson-Kinahan, from London, 600 do., do., R. Martin and Co.

June 20, per City of Oporto, from Hamburg and Antwerp, 2,200 bags cement, 304 steel joists, 70 cases window glass, to order.

**Macroon.**—Mr. P. Coughlan, Macroon, has been appointed engineer to the Board of Guardians.

**Rathdown.**—The Rathdown No. 1 Rural Council will, on 4th July, consider applications from qualified members of the Institute of Civil Engineers for the position of engineer in connection with the proposed drainage scheme for the Foxrook district.



## FERRO-CONCRETE CONSTRUCTION.

Messrs. J. and R. Thompson, of Roden-street, Belfast, and Fairview, Dublin, builders and licensed contractors for Hennebique's patent ferro-concrete construction, send us some recently-published sheets giving certain information about ferro-concrete construction on this system, and details of some of the work lately executed in the United Kingdom, which will doubtless be of interest to our readers. Reinforced concrete is a material which has come to stay. We generally regard it as an entirely new system, but so far back as 1854, Mr. W. B. Wilkinson, plasterer, of Newcastle-on-Tyne, had patented a system of slabs reinforced with iron bars, and provided also for a method of reinforcing the girders carrying these slab floors. It seems to have been a thoroughly practical arrangement, and embodied the elementary principle to modern construction. Since then, although others followed on the same lines, no very great progress was made, until comparatively recently, when quite a number of patents were taken out and new systems developed. In 1892, M. F. Francois Hennebique, of Brussels, took out the first patent for the well-known system now worked by the Yorkshire Hennebique Company, one of the most successful promoters of the principle of reinforced concrete in these countries.

The lasting quality of the material has already been amply demonstrated, and its applicability to all forms of engineering and architectural work is evident. Moreover, it is economical, and it is rather surprising to find that English engineers were far behind their foreign brethren in taking advantage of it. It has the advantages of economy, strength, simplicity, and can be adapted to almost any form of design, as already pointed out in our columns. The Hennebique system possesses many advantages, notably the economy effected in the use of the steel, by the scientific distribution of the reinforcement; this being attained by dispensing with the ordinary rolled steel joist, and substituting steel rods. These rods constitute the tension member, and are ingeniously stirrups up to the floor over to form a homogenous construction, which becomes practically monolithic.

Judging by the subjoined list of contracts which have been settled during the month of May by various licensees under the Hennebique patents, the activity displayed by engineers and architects in the adaptation of ferro-concrete seems to be distinctly on the increase. The most important works included in the list are the Parkstone Quay Extension and Transit Shed for the Continental Station of the Great Eastern Railway, near Harwich. It is a well-known fact that railway engineers are not in the habit of adopting systems of construction whose reliability has not been thoroughly demonstrated, and the decision of Mr. Wilson, the engineer to the Great Eastern Railway, in favour of ferro-concrete, must be taken as a further testimony in favour of that material.

## CONTRACTS SETTLED IN HENNEBIQUE FERRO-CONCRETE DURING THE MONTH ENDING

MAY 31, 1906.

**Industrial Works.**—Making-up room, etc., church near Accrington, for Messrs. Steiner and Co. Ltd. Contractors: The Liverpool Hennebique Ferro-Concrete Contracting Co. Coal Washery, Cardiff, for the Cardiff Washed Coal Co., Ltd. Contractor: E. H. Page, Cardiff.

"Stellite" Works, Aston, near Birmingham, for Messrs. Vickers, Sons, and Maxim. Contractors: Hobrough and Co., Gloucester.

Tank at Messrs. Ericsson's Cabinet Works, Beeston. Architect: A. N. Bromley, F.R.I.B.A., Nottingham. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds.

**Government Buildings.**—Ordnance Office, Southampton. Floors for H.M. Office of Works. Contractor: F. Grace, Southampton.

**Electricity Stations.**—Coal Bunkers and Foundations for Corporation Electricity Works, Rochdale. Engineer: S. Sydney Platt, M. Inst. C.E., Borough Engineer. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds.

**Grain Silos.**—Grain Silos, for Messrs. E. C. Robson and Son, Sunderland. Contractor: S. F. Davidson, Newcastle.

**Municipal Buildings and Works.**—Golf Pavilion, Queen's Park, Bournemouth, for the Borough Council. Engineer: F. W. Lacey, M. Inst. C.E., Borough Engineer. Contractors: Grounds and Newton, Bournemouth.

Tank at the Corporation Baths, Belfast. Engineer: Henry A. Cutler, City Engineer. Contractors: McLaughlin and Harvey, Belfast.

Covering of River Frome, for the City of Bristol. Engineer: Thomas H. Yabbicon, M. Inst. C.E., City Engineer. Contractors: Robt. H. B. Neal, Ltd., Plymouth.

**Coal Bunkers and Foundations, Rochdale.** (See Electricity Stations.)

**Public Buildings.**—Gallery and Columns for King's Theatre, Sunderland. Contractor: S. F. Davidson, Newcastle.

Premises for Y.M.C.A., Leeds. Contractors: The Yorkshire Hennebique Contracting Co., Ltd., Leeds.

**Quays.**—Extension of Parkstone Quay for the Great Eastern Railway Company. Engineer: John Wilson, M. Inst. C.E. Contractors: A. Jackaman and Son, Slough.

**Railway Buildings.**—Transit shed at Parkstone Quay, for the Great Eastern Railway Company. Engineer: John Wilson, M. Inst. C.E. Contractors: A. Jackaman and Son, Slough.

## ENGINEERING NEWS.

**Dundalk**.—**EXTENSION OF WATERWORKS.**—The Urban Council invite tenders for providing and laying of about 2½ miles of 10 inch diameter cast-iron water main, together with the providing and laying of hatch boxes on the new and existing mains, the building of a meter chamber and hatch box chambers with drainage therefrom, and other works. Plans and specification prepared by Mr. Maurice Sellars, C.E., Town Surveyor.

**Derry.**—Tenders were received for the construction of lattice girder roofing and shedding in Rossville-street, Derry, for Mr. George Dallas, Mr. W. E. Pinkerton, M.R.I.A.I., is the architect, 11 Shipquay-street, Derry.

**Fermoy.**—Tenders are invited for wrought iron gates and railings for Mrs. Dr. Dilworth's entrance at Fermoy, according to design of J. J. Murphy, A.M.I.C.E., Watercourse Mill Road, Cork.

**Glenleam (Co. Kerry).**—Tenders will be received to-day, 30th June, for the construction of an extension to the existing Board Pier at Glenleam, Valencia Island Mr. G. A. E. Hickson, C.E., 25 Denny-street, Tralee, is the engineer.

**Kilkenny.**—Messrs. Kelly and Son, Irishtown, have secured an important engineering contract, including the laying of water pipes, supplying engine, etc., in connection with the works which are being carried out on the Freshford-road for Captain the Hon. Otway Cuffe, T.C. The building contract, which includes up-to-date workmen's dwellings, is in the hands of Mr. Simon Costelloe.

**Kilkeel (Co. Down).**—**COUNTY OF DOWN.**—Tenders are invited for the construction of a concrete wall at Kilkeel Harbour. Tenders to be lodged to-day, Saturday, 30th June. Mr. James Heron, Co. Surveyor, is the engineer.

**Newbridge.**—**NEWBRIDGE WATERWORKS.**—The Naas Rural District Council will, on Wednesday, 4th July, consider tenders for supplying and laying a three-inch main from the above works to Captain Graham's premises at Ballymann, and thence to Mr. Gerald Hurley's, at Ballymann.

**Tuam.**—The Rural District Council will, on 30th June, receive tenders for making a sewer at Bishop-street, Tuam, according to specification.

## TIMBER, BUILDING, AND ALLIED TRADES.

—Young Man, having fourteen years' thorough knowledge of above in all its branches—Pricing, Estimating, Deducting Quantities, Adjusting of American and European Invoices, Freights, etc.; very rapid and sure at figures—desires engagement. Long experience of the requirements of the Dublin market. Apply, B 512, office "Irish Builder," Dublin.

**ARCHITECTURAL DRAUGHTSMAN AND DESIGNER,** fully qualified, quick and accurate worker, good planner, wants employment for whole or part time, or would do work at home. D728, this office.

**YOUNG MAN,** having 10 years' experience of the Building Trade, desires a situation as Builder's Clerk or Manager. Understands Plans and measuring same for quantities or work. Apply, "Northern."

# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

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34 LOWER ABBEY ST.,  
DUBLIN

Price 1d

## TOPICAL TOUCHES.

A new church is about to be built at Lissen, near Cookstown, Co. Tyrone, from the designs of Messrs. Ashlin and Coleman.

A large new hotel is about to be built at Killarney for the directors of the G. S. and W. Railway Company. Messrs. Batchelor and Hicks are the architects.

The Singer Sewing Machine Company are about building an office with a tower 625 feet high, and with forty-one storeys, in New York, at the corner of Broadway and Liberty-street.

The new Royal Infirmary in Manchester is being built at a cost of over £313,000. Messrs. Edwin Hall and Brooks are the architects, and Messrs. Arnold and Co., of Doncaster, the contractors.

A solid red polished granite drinking fountain and cattle-trough have been made for presentation to the city of Tokio by the Metropolitan Drinking-fountain and Cattle-trough Association of London. At the request of Viscount Hayashi, an inscription stating that the two were the gift of the London Association will be inscribed on the structures upon their arrival at Tokio.

Why not Irish granite also?

The arbitration proceedings instituted by the contractor, Mr. James Donovan, in consequence of a difference having arisen with the architect over certain extra and omitted works, opened on Monday last. Mr. Philip White, instructed by Messrs. Croker and Moran, appeared for the contractor, and Mr. John Bartley, instructed by Mr. W. J. Morris, appeared for the architect. The arbitrators were Mr. Anthony Scott and Sir George Moyers, with Mr. R. Caulfield Orpen as umpire. The amount in dispute is about £1,000. The case having been opened by Mr. White, a legal argument took place as to the finality or otherwise of the architect ruling in respect of extras. The arbitrators thereupon adjourned to allow arrangements to be made for the most effective way of deciding the important and interesting question involved.

On Tuesday last a party of about fifteen members of the Architectural Association left the North Wall for Kettering, which is the centre for this year's excursion. The four clear days' trip was a marvellous enterprise for the money, and those who were fortunate enough to be numbered amongst the happy band have every reason to count themselves lucky. The duration of the trip marks quite a new departure for the Irish Association, and amply justified itself. We hope an annual trip to England, or possibly Normandy, will become a regular fixture. In our next issue we hope to publish a full report and some reproductions of photos and sketches. Kettering is probably the finest four day centre in England. On Thursday, Mr. J. A. Gutch, of Kettering, who has done so much to make known in book form the English Renaissance, accompanied the party.

The centre for the excursion of the English Association this year is Stamford, an admirable choice. Applications to join should be made at once, as the number will be strictly limited.

The Dublin Artizans' Dwellings Co. are about building new offices in William-street, from the designs of their architect, Mr. C. H. Ashworth.

The Council of the Irish International Exhibition have issued invitations for a luncheon on Tuesday next, when there will also be a view of the new buildings, which are rapidly attaining quite imposing proportions. The surroundings are so excellent that the buildings look very fine; indeed.

The International Congress of Architects opens in London on Monday next. A brilliant as well as a practical week has been arranged, and, granted favourable weather, should prove most enjoyable. Architects who have not already joined may still do so by at once sending in their subscriptions to the secretary of the Royal Institute of Architects, Conduit-street, London. The minimum subscription is one guinea.

On Wednesday next, 19th inst., the Rathdown Rural District Council will consider tenders for the Foxrock drainage scheme, for which Messrs. S. F. Comber, M.I.C.E., and Mr. Pansing, A.M.I.C.E., prepared the plans and specification. Mr. Comber having resigned his connection with this work, it will be completed under the supervision of Mr. P. H. MacCarthy, B.E. The contract is expected to amount to £7,000, or thereabouts.

The Governmental inquiry into the working of the Department of Agriculture and Technical Education, having concluded its sittings in Dublin, has been holding inquiries in the provinces. The other day it sat at Castlebar. Although the evidence mainly applied to agriculture, a good deal of reference was indirectly made to technical education. There would seem to be a general consensus of opinion that whatever good may have been done to agriculture, little or no practical benefit has resulted to the cause of technical education, properly so-called, through the operations of the Department.

The Rev. Bernard Quinn, in giving evidence, summed up these views as follows: "His own opinion was that a factory should be erected here and there and have a school connected with it. Learners should be put to work in the factory under skilled hands, lectures should be given in the evenings, and scholarships should be open for the clever pupils, so that they might be enabled to go abroad and see improved methods in a particular industry. It was a wrong application of the funds to apply money in scholarships for the purpose of advancing pupils to the professions. What the Department required was an extension of its powers and a large increase in the funds." The Department have, it may be mentioned, adopted this course in the case of the Galway Granite Works and one or two other industries, which it is proposed to subsidise to a certain amount in return for their giving technical instruction in the particular trade or craft followed. This is on the right lines, because it trains boys in the only really practical fashion and enables them to acquire an efficient working knowledge of their calling, such as would enable them to compete with the workers of other countries. Father Quinn concluded by saying that "the powers at present vested in the Department enabled them to give instruction in technical branches, but they had no power to put that knowledge into practice in this country."



## CHURCH TOWERS AND SPIRES.\*

BY MR. W. H. BIDLAKE.

In a survey of the development and design of English mediæval towers and spires, the prospect which stretches away before the mind's eye from Tudor to Saxon England is so extensive, and it may be viewed from so many stand-points, that it would be impossible in an hour's paper to do more than refer broadly, in some cases even superficially, to the more salient features which arrest attention. Moreover, the subject is so attractive, and is capable of being attractively illustrated, that many have taken in hand to set forth in order its principal features, and I shall not attempt to adduce any new facts or invent any new theories. It is difficult, indeed, unless one is content with minor examples, to find any illustrations which have not already been given in that excellent series of drawings in "Wickes Towers and Spires," which, since its publication in 1855, has been regarded as the standard work on the subject. And it is a subject which is so dependent on illustration that I shall rely on the lantern photographs rather than any words of description.

I will first illustrate the historical evolution of the tower and spire, and its employment in connection with the rest of the building, and then consider some special points relative to tower and spire design.

The typical position for the tower in an English church is the centre of the west end, making, with the western terminations of the north and south aisles, a symmetrical facade.

Usually the tower stands free on its three sides, but occasionally the aisles are brought up to its western face.

As the tower in this position forms the western termination of the nave, it contains on its west face the central doorway and the west window.

The whole composition is evidently intended to impress the worshipper as he approaches it from the front. It is the frontispiece, behind which the church lies more or less hidden.

This is still more the case with the typical cathedral front, where two towers flank the central doorway, and the composition is still less suggestive of the sectional outline of the nave and aisles behind, especially when, as in so many French examples, the central gable is masked by a horizontal arcade.

It is not unlike, in its intention and conception, the facade of an ancient Egyptian temple, which masks the building behind, and in which the pylons flanking the central doorway may be compared to the western towers of the Gothic cathedral.

Occasionally, indeed, a still more magnificent facade is presented, either by extending the screen beyond the towers to flanking north and south turrets, as at Lincoln, or placing the towers themselves outside the aisles, and decorating the extended front with splendid sculpture, as at Wells, or, grander still, the arcaded caverns of Peterborough.

At Exeter twin Norman towers form the transepts, while Ely is the only example of a cathedral with a western tower on the central axis, a position so common in the parish church.

Some of our cathedrals have no western towers now remaining, as Winchester; and poor, indeed, do their fronts appear in comparison with those we have been considering.

The dome of the byzantine and the lantern of Spain and the South of France becomes, in Normandy, the central tower, and no Norman or Anglo-Norman cathedral was complete without it. In France the loftiness of the high vault compelled her architects to substitute for the central tower the elegant, but far less imposing, timber *flèche*; and if, after contemplating the wonderful loftiness and airiness of her cathedrals, we return dissatisfied with the low proportions of our own, let us find our consolation in the fact that this very lack of internal height has secured for us the retention of the central tower.

The typical Norman cathedral, then, had both central and western towers, as at Southwell, and it is only when all three are present that the English cathedral realises its full majesty, and becomes, in fact, one of the grandest works of man.

It is possible that each tower was intended—after the Norman period—to carry its spire. Not a few had timber and lead spires at one time, which have since been taken down. Lincoln once had small timber spires on the western towers, as shown on old prints, and a spire no less than 523 ft. high on the central tower. It is possible, too, that Peterborough was intended to carry spires on all its five towers, but Lichfield alone of all the cathedrals retains

her triple spires, and these endow her with such grace that she becomes one of the most beautiful and distinctive in the country.

In the smaller Anglo-Norman churches a central tower, or, rather, one which occupies an analogous position on the central axis at the eastern part of the nave, is not uncommon, as at Illey.

Occasionally a western tower also exists, and this tandem disposition recalls the twin towers so common in Auvergne, as at Issoire and Brioude and in other parts of Central France, although it is improbable that there is any historical connection between the two types.

Of the Saxon towers still remaining, many of them are in the centre of the West End, as at Earls Barton, and it seems not improbable that the western position of the tower in subsequent styles was due to a continuation of this essentially English arrangement; a supposition rendered the more probable by the rarity of central-western towers in Normandy.

If we pursue the subject backwards, and ask what was the origin of these Saxon towers, we are led to the larger subject of the origin of the Romanesque tower, and to a consideration of those at Tours, Ravenna, Milan, and Central Syria. But this would lead us astray from our present subject.

Although the central-western position of the tower is the typical one for the parish church, the tower is occasionally found on one side, as at St. Mary Redcliffe, Bristol, or All Saints', Stamford. At Wisbech, the tower is almost detached from the church, and in the surrounding district may be found several instances in which it is wholly so.

The magnificent tower of West Walton, some few miles away, forms, in fact, the lychgate of the churchyard.

Detached towers are also a local peculiarity of Herefordshire.

While, in an overwhelming majority, the tower plan is square, the octagon is occasionally found, as at Stanwick; and in Norfolk and Ireland the round tower is frequent, in the former due to the use of flint and the difficulty of building quoins in that material.

Both Saxon and Norman towers must have been roofed with wood, and a simple squat pyramid, like those which the late Mr. Christian reconstructed on the Norman west towers of Southwell, must have been very frequent, because their construction would be the simplest and most direct.

But timber spires must also have existed, for they are represented in old manuscripts. Their form, in all probability, resembled the ancient timber spires still existing at East Meopham and Newhaven, which, though not of actual Norman date, probably reproduce the design of the Norman originals.

This form of spire is octagonal in its upper portion, the diagonal sides bending out below towards the angles of the tower, which they meet in a point. Its shape is due to the timber angle-pieces of the spire being framed into a collar, which is supported by the hip rafters of the lower spreading sides.

This type of spire is common in Germany, as at Erfurth, and still more so in Scandinavia, as at Alskog and Bro, in the island of Gotland.

Its character varies considerably according to the relative slope of its upper and lower portions.

A fine modern example is that of All Saints' Church, Margaret-street, by the late Mr. Butterfield.

Both this form of spire and the squat pyramidal roof were subsequently translated into stone, and the former may be found as late as the Perpendicular period, as at Bythorn.

We may also suppose that an octagonal timber spire arose sometimes from the flat upper surface of the cornice, and gave rise to that form of spire so common in France, of which Christ Church, Oxford, is an example.

This form, however, like the simple pyramid, was destined to die out, while the broach spire which, if it did not originate in Northamptonshire, was certainly developed in that district, took its place in the Lancet period.

The broach spire is, in the main, a copy in stone of a timber roof, and its cardinal sides come down over the sides of the tower and end in dripping eaves; but the broaches which fill the triangular spaces between the diagonal sides of the spire and the angles of the tower are of true stone construction, and, whether their sloped sides meet those of the spire high up or low down, will determine very much the general outline and character of the spire.

At first these broach spires are of an obtuse angle, and have bold spire lights. They appear as veritable stone roofs, and, whether they rest on a slight cornice or corbel table, always overlap the walls of the tower to form

\* A paper read before the Architectural Association, London,

dripping eaves. One of the noblest spires of this type is to be found at Frampton, a small village near Boston, hidden among trees.

In the towers of the Lancet period buttresses are sometimes employed in pairs at the angles—the diagonal buttress comes later—but they stop at the belfry stage against the flat pilasters which have been retained from the earlier style. The staircase turret likewise stops short either at the belfry stage or the spire eaves, and a corbel table is carried between the angle pilasters so as to offer an unbroken square as seating for the spire.

In some cases, as at Ely, Walsoken, West Walton, and Sutton St. Mary, bold octagonal buttresses occur at the angles of the tower, and reach to the cornice. These must either have been finished with pinnacles, as at Oxford Cathedral, or have carried timber spirelets in conjunction with an octagonal timber spire over the tower, as at Sutton St. Mary.

Possibly towers of still earlier date were similarly treated, for the Norman central towers of Norwich and Tewkesbury probably had pinnacles or spirelets at the angles, and Tewkesbury once had a timber spire.

With the exception, however, of an occasional saddle-back roof, it is improbable that any towers were considered complete in the Lancet and Geometrical periods without a spire either of timber or stone.

As the style advanced the broach spire became more acute and loftier, and the broaches and spire lights less in proportion. The broaches, moreover, began to take to themselves pinnacles either at the extreme angle of the tower or at their apex against the spire, or mid-way up the slope. The central spire of Lichfield has two pinnacles on each broach.

Next, the bottom spire light was no longer placed on the cornice, but higher up the spire, and the upper spire lights more frequently alternated on the diagonal and cardinal sides. Their gablets were frequently crocketed, and the niches with crooked gable heads were placed at the apex of the broaches lying back on the spire, as at Ketton and St. Mary's, Stamford.

The spire itself becomes ribbed or ribbed and crocketed along its angles, and has an occasional horizontal band or moulding, and more pronounced mouldings and a more definite cornice mark its junction with the tower.

At length a momentous change takes place—cornice and dripping eaves are alike abandoned, and a passage is made round the base of the spire; probably a practical innovation to facilitate the repair of the spire; for spires were more frequently struck by lightning in those prelightning conductor days than at present. For safety's sake the passage required a parapet.

Although the parapet might slightly overhang the faces of the tower, being carried forward on the cornice, especially when pinnacles supported it at the angles of the tower, yet it was necessary to set the spire and its broaches in a little so as to allow room for the passage. And thus commenced the shrinking of the spire.

Woodford is a simple example of a parapet carried round a broach spire, and, near by, Denford, across the meadows of the Nene, has a parapet carried round a spire of the timber type.

Some very fine steeples belong to this transitional type, and pre-eminent among these is Grantham. Not far away is Newark, evidently by the same architect.

Heckington is a particularly noble steep of this type. It is of strong outline and fine proportions, and its large hexagonal pinnacles admirably support the lines of the spire. It has but little ornament—a little crocketing on the buttress gablets, and some carved bosses in the cornice, and the belfry lights are single. It is one of those masterpieces which are independent of any added ornament for their beauty.

In the simple type of broach spire the lines of the broaches satisfactorily carried down those of the spire to embrace the angles of the tower, and, whether seen in front or diagonal elevation, there was a complete unity between tower and spire.

Not so with the parapet spire. The first effect of the parapet is to introduce strong horizontal lines between tower and spire. Its second is to cause a certain shrinking of the spire to allow a passage round its base. The third is still more important, and more pregnant of future development.

It results from the fact that, while the apparent breadth of the tower increases from the front to angle elevation in the ratio of the side to the diagonal of a square, that of the octagonal spire remains the same. Hence the spire which seems in correct proportion to the tower on front elevation, appears too narrow and shrunken on the angle elevation, and the angle pinnacles in like manner appear

to have moved away from it, leaving a disconnecting and awkward gap in the skyline.

As long as the broaches were retained their full height behind the parapet, as at Newark, this difficulty hardly presented itself.

But hardly had the parapet been introduced when the broaches began to shrink, and, ultimately, to disappear behind it.

Then commenced a series of experiments to overcome this double difficulty, namely, the disconnecting effect of the parapet between tower and spire on the one hand, and the difference between the apparent proportions of tower and spire on the front and angle elevations on the other.

The most evident solution, and the one that was at first attempted, was to make the angle pinnacles of the tower so massive and tall that the tower should seem to be carried up into the domain of the spire, and the pinnacles themselves should, on the angle elevation, appear to support the spire and fill up the gap between its sides and the angles of the tower.

These large pinnacles begin to appear, in fact, before the broach had quite disappeared, as at Heckington.

Other fine examples are to be found in St. Mary Redcliffe, Bristol, and the western towers of Lichfield Cathedral.

The disadvantage of this arrangement is that the pinnacles tend to block the passage round the spire.

At Oakham the pinnacles, though still massive, are rather smaller, and are connected with the spire by horizontal masses of masonry, which are pierced so as to form bridges across the passage. It is the embryo of the subsequent flying buttress.

The second method adopted was to keep the tower pinnacles comparatively low and subordinate them to an inner range which filled the space between them and the spire, as in the central tower at Chichester, or the more magnificent one of Salisbury.

In fact, in this grand example, the problem seems solved.

The inner pinnacles are a mean between the outer pinnacles and the spire, and the eye, following upward the lines of the tower, passes by easy steps from angle pinnacles to inner pinnacles, and from these to the spire itself. Tower and spire are welded together, and the unity of the broach steeple is restored. Moreover, the angle view is equally satisfactory with that in front.

Yet the parapet is not sacrificed; the tower and spire retain their respective characters, and there is not that confusion between them which one finds sometimes on the Continent, as at Freiburg and St. Stephen's at Vienna, in which it is impossible to say where tower ends or spire begins.

An elaboration of this idea is to be found at St. Mary's, Oxford. Here, in place of the tower pinnacles, each of the pair of buttresses at the tower angles carries an elaborate gabled and crocketed canopy over a sculptured figure, and the inner pinnacles are in two stages, with similar elaborate ornament, the whole combining with the spire lights to form a cluster of richly-decorated gablets and pinnacles, from the centre of which the spire rises.

This type of clustered spire reaches its fullest expression in the south flanking tower of the west front of Peterborough, in which graceful triangular spirelets rise between tower pinnacles and spire having one side of the triangular base adhesive to the spire, and the opposite angle carried by the tower pinnacle, and allowing a clear passageway beneath. The height of the spirelets is so arranged that their apex is on the line drawn from the apex of the tower pinnacles to that of the central spire.

In contemplating such an example as this one recognises that the central spire is only one of a cluster, and has entirely ceased to represent the tower roof, as in such early broach spires as Frampton. It has, in fact, ceased to be an essential part of the tower, and has become only an ornamental accessory. It is, therefore, sooner or later, doomed to obey the inexorable law of extinction of useless members.

But there was yet a third way of connecting angle of tower with spire, and one which became very popular with the Perpendicular architects. It is to put a small pinnacle at the tower angle, and connect it with the spire by a flying buttress; a poor contrivance, but serving in some degree to carry the eye over the hiatus between tower-pinnacle and spire on the angle elevation.

The buttress abuts against the centre of the diagonal side of the spire, and seems sadly to lack articulation, and its particular form suggests resistance to a thrust, which, if it existed, would make short work of buttress, pinnacle, and all.

Higham Ferrers and Rushden may be taken as typical examples of this method. Also Moulton and Whittlesea.

The magnificent steeple of Louth is the only one in



which the flying buttress seems worthy of its position. No; I am forgetting, there is one at Newcastle, in which the flying buttress has run away with the spire.

At Middleton Cheney an inner range of small pinnacles is introduced, and these are connected by flying buttresses, both with the spire and the tower pinnacles. It suggests a tentative arrangement which, in the neighbouring church of King's Sutton, is fully worked out. Here the inner pinnacles are of fine proportions, while the tower pinnacles are mere outliars, but connected by a strand of stone which really suggests open tracery than a flying buttress. This really belongs to the group of clustered spires, and is very elegant and beautiful.

We now come to the fourth and last method of uniting tower and spire—by the interposition of an octagon.

This occurs in its most rudimentary form at Abingdon, which consists in little more than setting the spire on an octagonal drum, and marking the junction by an embattled string.

At Exton, a beautiful little steeple, amid beautiful surroundings of wood and park, affords an excellent example of the employment of the octagon. The tower pinnacles finish in miniature embattled octagons, which assists in harmonising tower and spire and giving breadth to the design. The octagon, however, seems so evidently to exist at the cost of the spire that the latter looks somewhat strangled by it.

But you will already have forestalled me, and arrived at Coventry first. It is impossible to speak of the association of octagon and spire without immediately thinking of St. Michael's.

Whilst everywhere in the Perpendicular period they were more busy with towers than spires, the Coventry people seem to have reared their steeple as a vindication of the spire and a protest at its increasing neglect.

And a very noble steeple it is, although it excites our wonder as a *tour-de-force* as much as our admiration as a design. The truth is it looks a little too unstable; attention is written on every part; the octagon seems balanced on the tower, the spire on the octagon, and the weak ooze flying buttresses add very little to the sense of stability, and rise too high from the tower pinnacles, which are themselves weak in outline.

The corona of open panelling at Patrington serves a similar purpose with the octagon, and may almost be regarded as such. A fine design is here marred by the ridiculous straddle tower-pinnacles and their flying buttresses, and the poor belfry windows.

If at Exton the octagon is taken out of the spire, at Wilby it is no less evidently taken out of the tower. The three stages are too equal, and the tower is low in proportion, and appears crushed by its load.

It is on the same lines as this steeple that some of the large German steeples are designed, to which I have already referred, and in which the tower passes insensibly into the spire, as at Frieberg, St. Stephen's at Vienna, and Cologne Cathedral.

At Grafton, near Huntingdon, the angles at the upper part of the tower are cut off by squinches carrying pinnacles to form an octagonal base to the spire, an arrangement of which Bloxham may be considered as an elaboration.

But if it is true that in the Perpendicular period some of our most famous spires were erected, it is no less true that it is the tower which is characteristic of the style.

For by this time the spire had come to be regarded so entirely as an ornamental adjunct and finish to the tower that there was no reason why, if the design required it, it should not be dispensed with altogether. The tower, too, is more in keeping with the pervading rectangularity of the architecture of the day.

Moreover, the spire was costly, and involved a more difficult problem in design and construction than a square tower with parapet pinnacles and a flat timber roof.

Not that one would wish to disparage the late gothic tower, for it shares with the fan tracery vault, and the open-timber roof the honour of demonstrating to the world the vigour and originality of the English Perpendicular school.

That the Perpendicular builders were sensible of the value of the spire as a crowning feature of the design, the steeples of Coventry and Louth are sufficient witness, and they not infrequently erected timber and lead spires over towers which were otherwise complete without them, as, for example, the three towers of Lincoln.

As Northamptonshire and Lincolnshire, with Peterborough as centre, is the home of the spire, so Somersetshire, with Glastonbury or Wells as centre, developed the most important school of tower design, although Norfolk and Suffolk may lay claim to many excellent examples.

The Somersetshire type is sufficiently distinctive, not-

withstanding considerable variation in individual towers, that it can be at once recognised.

Of lofty proportions, these towers are usually divided into three stages: by string courses, and the buttresses, which are in pairs, are set in a little way from the angle of the tower, allowing the string course to peep out, as it were, at the angle. The buttress weatherings usually line with the strings, and carry crocketed pinnacles set diagonally, and with one angle engaged with the buttress face above.

Similar pinnacles flank the windows of the belfry stages, pierce the centre of the parapet, or are employed at the tower angles with larger pinnacles to form a complex pinnacle system, in which at times an isolated pinnacle is hung out at the angle, supported by a grotesque below, and united above by a strand of stone to the main pinnacle, as at Huish Episcopi.

The parapets are usually embattled, and have pierced traceried panelling, and occasionally, as at Glastonbury and Taunton, are very elaborate. In these cases the angle pinnacles are usually of open tracery work.

The lowest stage of the west face is occupied by the Tudor arched door, enclosed within a square frame of mouldings, which are sometimes the plinth mouldings brought over. The west window is placed immediately over the door or at a short distance above. Niches for sculpture are often freely used for surface decoration, and the coupled belfry windows are usually filled with a stone lattice of pierced quatrefoils in place of the usual oak louvres. Occasionally too, sunk quatrefoils form decorative bands beneath the main cornice or intermediate string courses.

There are several fine towers outside the Somersetshire district which belong, more or less, to this type, as at Wrexham and Evesham.

St. Neots, near Huntingdon, has an unusually fine tower for the district, with certain points of resemblance to the Somersetshire towers. But the strings and buttress weatherings do not line, the engaged pinnacle is of different design, and the belfry lights are insignificant, and go far to spoil the beauty of the design. The central portion of the parapet is carried up higher than the sides in a manner peculiar to this eastern district, other examples occurring at Huntingdon, St. Martin's, Stamford, and Wisbech.

A smaller, though not less beautiful, tower is to be found at Tichmarsh, in the land of spires, decorated with quatrefoil bands and gabled niches, and crowned with a forest of pinnacles.

Here, as in many east county towers, a band of quatrefoils is carried beneath the plinth weathering.

There a few towers carrying octagonal lanterns, as at Irthlingborough. At Lowick the whole design is of excellent proportion, and the octagon ends in a corona of pinnacles.

But the grandest example is to be found at Boston, irreverently called "Boston Stump."

The central tower, that crowning glory of the English cathedral, differs from those hitherto described in that it stands on four isolated piers hidden by the adjoining roofs. As a consequence the bold angle buttresses are dispensed with as there is no support for them, and the tower rises to the parapet without a break in its vertical lines. A comparison between the central and western towers of Canterbury will emphasise this point.

Very frequently the central tower carries an octagonal thickening at the angles which carry the angle pinnacles, as at Lincoln.

The western towers of this cathedral, though of rather later date, are designed on similar lines.

Sometimes small diagonal buttresses are employed, feeling out, as it were, towards the angles of the crossing, as at Gloucester, and its reduced and improved copy at Malvern.

Inasmuch as the central tower has to span the nave and transepts, it is necessarily broad, and, as it rises only two stages above the roof, its chief characteristic is its imposing mass, as at Hereford and Wells.

Hedon is a fine example of a central tower over one of the larger churches, and Melton Mowbray over one of the smaller ones.

Many of the features of tower and spire design have already been noticed in the survey of their development. It remains to examine one or two points more in detail.

With the exception of the central towers most towers have an upward diminution, not only to give them an air of stability, but, when they carry spires, to counteract the optical illusion of their spreading outwards at the top, due to slope the line of the spire.

This diminution is obtained in various ways: By setting in each stage on the string course from the stage below, as in the Saxon towers and the Lancet towers of West Walton and Walsoken; secondly, by the diminution of buttress projection, as in the vast majority of towers; and thirdly, by

giving a batter to the tower, or to the buttress, or both, as at Market Harborough.

Small towers occasionally have no buttresses; the majority have pairs of buttresses, either exactly at the tower angle, as at Grantham, or set in a short distance, as in the Somerset towers; a less number have diagonal buttresses, while not a few have an octagonal thickening at the angles. St. Margaret's, Leicester, has diagonal buttresses set upon the usual pair of buttresses below.

Of the octagonal angled towers, Magdalen Tower, Oxford, is a fine example.

This tower also illustrates an important point in tower design, the severity and plainness of the lower stages, and the increase in lightness, elaboration, and ornament, towards the top.

The fenestration of the Lombard towers followed this principle, and Giotto's campanile is also an excellent example of it.

Lancet towers, on the other hand, are frequently covered with tiers of arcing over their whole surface, which extend even round the octagonal angles, as at St. Mary's, Stamford, and West Walton.

Raunds has a unique decoration of zigzag weatherings, with the angles decorated by sunk quatrefoils.

The staircase turret has already been referred to as stopping beneath the broach spire, or even below the belfry stage.

Sometimes it is incorporated with the angle buttresses, as at Heckington and Grantham, in the latter case carrying a larger pinnacle than the other tower angles. At other times it projects boldly from the middle of the face of the tower, or near one angle, or at the angle itself, and stops below the parapet, or is carried up above it. In the latter case it is often finished with an embattled top or spirelet.

Next to the main line of stages, buttresses, and strings, the belfry windows claim our attention. They are, as it were, the eyes of the tower, and a tower without them does not look intelligent.

Single belfry lights are to be found at all periods, from Polebrook and Heckington to York and Boston. These are often supported by blank panels at the sides, as at Denford and Frampton, or, to take later examples, by the traceried panelling of St. Peter's, Derby.

But the general rule is to group the belfry lights in pairs. To more intimately associate them they may be placed beneath the same gabled weathering, as at Newark, or even under the same label, arched (Grantham) or ogee (All Saints', Stamford), or square (King's Sutton), or a crocketed pinnacle may be run up between them.

As with the single lights, the wall on each side may have flat panels of similar design to the belfry windows, as at Oundle, or the panelled decoration may be so completely carried over the surface that the belfry lights appear rather as interruptions in it, as Gloucester. Or, again, they may be supported by niches, as at Northleach.

Less frequently the lights are arranged in triplets, as at Ketton and Kettering.

The lights themselves may have heads of all shapes—obtuse lancet, ogee, or square-headed, as at Aldwinkle, St. Peter's, and Bath Abbey.

The transome frequently occurs, and occasionally the jambs and mullions are extended down below the sill to enclose a traceried panel, which may extend to the next string course. St. Cuthbert's, at Wells, is one of many instances.

The ringing stage usually has single and less conspicuous windows, although in some of the great towers and steeples they are double and of large proportions and elaborate ornament; examples of such occur at Coventry, Louth, Wrexham, and Taunton.

The lowest stage of the tower facing west contains the grand door, for use on State occasions, with the west window over it, forming in many cases, one composition with it by having its sill on the tower hood mould, as at Northleach, or being included within the same arched recess, as at Whissendine.

Many of these west doors are very fine, as at Kettering and Middleton Cheney, and are worthy of separate study.

In the Northamptonshire district the west door is recessed with a shallow porch, which further emphasises its importance.

Such occur at Higham Ferrers, at Rushden, and at Keystone, and, with these illustrations, I will bring my paper to a conclusion."

Mr. G. H. Fellowes Prynne said he had much pleasure in proposing a hearty vote of thanks to Mr. Bidlake for his paper. Of those who really loved Gothic architecture Mr. Bidlake was one who sympathised with it intensely, and in his own work he showed that his heart and soul were in what he did, and his paper and the lantern slides showed the great

amount of care and trouble he had taken in working out the gradual development of towers and spires. Papers like this were very interesting, especially to students, for they directed attention to little differences, which gradually led to greater and important differences. From the actual development from the wooden roof of the tower, which Mr. Bidlake had put before them so carefully, one saw that in all constructional work it was a natural growth and evolution from an earlier phase of work, and in this case we saw the gradual growth of the broach coming from the timber construction, and thus leading to similar forms in stone construction. He thought that the spire, of all other details of our English Gothic work, was one of the most beautiful. It had been said that it was an unnecessary adjunct—a luxury of our architecture. So it was in one sense, but it was both exquisite in form—or might be—and it was beautifully symbolic. One could think of how the Greeks would have revelled in having such a form, and how beautifully they might have treated it had they conceived it in their time. He thought that Mr. Bidlake might have mentioned such a beautiful little example as Lostwithiel, in Cornwall—a beautiful little XIVth century stone spire, pierced at the base, which Street, Butterfield, and others had greatly admired. As to wooden spires, we had lost a good many by fire, and a good many had been warped by the heat of the sun—the sun acting on the lead had heated and warped the wood, and, in some cases, had caused the wood to burn. Again, lightning had caused the destruction of some wooden spires. At Barnstaple, Chesterfield, and elsewhere, the spire had gone over to one side owing to the warping of the wood. Mr. Bidlake had mentioned Ketton, which was a beautiful church, but had a somewhat heavy spire on the top of an exquisitely beautiful tower. The subject was one which made them feel proud of our national Gothic art, and it was a pleasure to see that such a fine collection of lantern slides had been brought together to illustrate this interesting subject.

Mr. Francis Bond seconded the vote of thanks. He had been very much interested to notice that, though Mr. Bidlake was one of our most accomplished draughtsmen, they had not seen a single example that evening of his own draughtsmanship. Mr. Bidlake had relied on the despised art of photography, and, as a bit of a photographer himself, it had been a pleasure to him (the speaker) to see photography made such use of. As to the paper, he agreed with almost all Mr. Bidlake had said. They had had the west front of Peterborough on the screen, and one spire was shown to be more satisfactory than the other, and the reason for that was that one spire was 14th century work, and the other was 15th century; they look alike, but one was a colourable imitation of the other. The two spires at Lichfield had the same curious history; one was a 15th century sham pretending to be a 14th century. As to the introduction of the flying buttress, he thought the reason was, as Mr. Bidlake had pointed out, that people saw that a pinnacle was not satisfactory unless it was carried well back, and placed near the foot of a spire. But if put well back, or pretty near the spire, or, if there were two pinnacles, one outside and one inside, and there were repairs to do to the spire, the workmen could not get round the spire because of the pinnacles; but with flying buttresses the materials could be got round. Most of these features become beautiful in the hands of artistic builders, but they had some utility at the bottom of them, and that might be the case with flying buttresses in connection with spires. As to optical corrections, one got the idea that the Greeks were very subtle in the refinements of some of their buildings; and there were many of these subtleties. He did not intend to speak of Professor Goodyear's amazing series, and, as to our English spires, they were made in some cases to bulge a little at the centre, just in the way the Greeks treated their columns. For instance, in looking at the details of Louth spire, he was struck with the clever way the entasis had been obtained; the builders did not bulge out the eight sides, but they enlarged the crockets half way up, and then gradually diminished them in size. The people who did that were as clever as the Greeks. So it was with the windows of the late spires; they got smaller and smaller in fixed ratio as they went up. But some diminished more rapidly than they ought to do, and the result was that, because of the sharp diminution of size, the apparent height of the spire was increased. He agreed with what Mr. Bidlake had said as to the slope of the weatherings of the buttresses.

Mr. Arnold Mitchell, in supporting the vote of thanks, said that two points had struck him. One was that the system and method of study which Mr. Bidlake had evidently given to his subject was one which might be commended to all students. Mr. Bidlake had traced the development of the tower and spire from the early to the late



periods, and the knowledge he had shown them in all he said was only to be acquired by travelling here and there and examining, sketching, and photographing. It was only possible to get such an accumulation of knowledge by systematic and continuous labour and study. The constant visiting of many examples had enabled Mr. Bidlake to store up in his mind the facts as to the stages by which the late work grew from the earlier, and it was this particular presentation of his facts which made the discourse so delightful to follow. The other point was as to the way in which Mr. Bidlake had traced the development of the spire from the timber construction. It seemed to him (the speaker) that there was another point of view, and that was that, judging from the study of old examples, it was not necessarily a timber construction which originally started the spire; the spire may have been begun with the endeavour of the builders to build, if possible, in a permanent material. We found that where builders had acquired the necessary skill in the use of materials and tools they abandoned perishable materials and built in stone. That was seen in vaulted roofs; as the builders attained facility in construction, the stone construction was applied to a wider space. That was seen in Normandy, in the tower especially, and it was the roofing of a tower with stone from which (it seemed to the speaker) the stone spire was developed. The tower finished internally with an over-sailing course. On the oversailing course a second oversailing course was placed, and so on, and these oversailing courses gradually formed a little, low, pyramid roof, and the spire was only a prolongation of this. Gradually the pyramid form was raised, the faces became more and more acute, and so the spire form was achieved.

#### THE MASTER BUILDERS' ASSOCIATION AND THE NEW CONDITIONS OF CONTRACT.

The following letter has been addressed by the Hon. Secretary of the Master Builders' Association to the Royal Institute of Architects, Ireland:—

DEAR SIR,—Your letter of the 19th inst. has been under the consideration of my Committee, who have requested me to inform you that since 1899 your Council and my Committee have been in communication, with the object of agreeing on new conditions of contract for the whole of Ireland, instead of the great variety of forms at present in use, at our request, and also to meet your views as expressed in your letter of the 2nd June, 1900, which states—"It is desirable in such a vital matter that uniformity throughout the Kingdom should be secured."

When a settlement was arrived at in 1903 between the members of the R.I.B.A. and the Federation of Master Builders of Great Britain and Ireland we at once wrote offering to accept the new conditions for the whole of Ireland, which conditions were then understood to be acceptable to your members. Before adopting this suggestion you referred it to your Sub-Committee but we were not informed of the result of their deliberations, though we wrote you several times, until in January last, when we learned that your Council had approved of new conditions of contract, and had sent them on to a general meeting of your Institute for adoption, without any reference or consultation whatever with us. Further inquiry revealed the fact that your Council intended to adopt and put into use these new conditions without any such reference or consultation with the Master Builders, and only on receipt of a strong representation from us on the 26th of January last did you send us a copy of the new conditions, which had already been approved by your Council some two months previously, and which then only awaited the approval by your general meeting.

On receipt of the copy of the new conditions on the 10th of February last we at once communicated with the other Builders' Associations in Ireland, and sent them copies for their considerations and views (as the new form was intended to apply to the whole of Ireland).

The Belfast Builders' Association had the matter under their consideration when they learned that the Ulster Society of Architects had declined to approve of the new conditions which you had prepared. The Ulster Society subsequently prepared new conditions of their own, a copy of which only reached us a few days ago.

Our Committee were then face to face with the difficulty for the first time that a uniform form of contract for Ireland, as contemplated and hoped for, was thus rendered impossible, and though your Council were aware of this serious development, we learned to our surprise from the public papers that your members had adopted these conditions at their meeting on the 30th ult. without any further communication with us.

It is more than two years since you informed us that this matter had been referred to your Committee, and because the Master Builders' Associations in Ireland—for the reasons already given—have not been able to get through the details of this very long and intricate document, and send you their views inside sixteen weeks, these conditions have been adopted without any notice or further comment whatever.

In England and Scotland the mode of procedure adopted was that in each instance Committees were formed consisting of both architects and builders, who went into the matter clause by clause with the assistance of their legal advisers on both sides, and eventually in each case, after much labour, succeeded in approving of conditions that are acceptable to both parties, and a credit to those associated with their preparation; while in Ireland we are asked to accept conditions that have been prepared without such consultation with the builders and their legal advisers, and which, as far as we know, have not had the approval of any eminent counsel conversant with building contracts.

Reference is made to the action of our members in agreeing to sign the conditions at present in use in our city, and those as issued by the R.I.B.A., while the arbitration clauses are so different. The reason for this is the desire on our part that no interruption should for the present be caused in dealing with those who do not wish to use the R.I.B.A. conditions; but my Committee are strongly of opinion that a form of arbitration clause, such as that recommended and issued by the R.I.B.A. is absolutely necessary in the interests of equity, and to bring building contracts into line with all other commercial transactions.

We trust that these remarks will enable your members to see the necessity of such consultation on the lines referred to as will lead to an equitable agreement on the conditions of contract to be used in the future. My Committee will be glad to co-operate in any arrangement to this end.—I remain, yours faithfully,

JOHN GOOD, Hon. Sec.

55 Great Brunswick street, Dublin,

27th June, 1906.

R. Caulfeild Orpen, Esq., Hon. Secretary, Royal Institute of Architects, Ireland, 13 South Frederick st.

#### CORRESPONDENCE.

##### LONG ROPE FERRY WITHOUT AN ATTENDANT.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR SIR,—I should be much obliged if any of your readers who know of a ferry boat working across, say  $\frac{1}{2}$  mile, by rope or chains, without any attendant, and not hindering navigation, would correspond with me, or answer in your very useful paper.

Note that a passenger waiting at the opposite side from boat must be able to bring it back to himself.—Yours, etc.,

J. P. B.

[Ferries of the nature you mention are quite common abroad, but not for such long spans as you give. We are afraid that the distance would offer great difficulties, as the sag in the rope would be so considerable. We are making further inquiries, and if we hear of anything that is likely to suit you we will communicate with you or notify the result in these columns. A rope ferry such as you describe, but on a very small scale, may be seen working across the Liffey, in Captain Colthurst's demesne, at Lucan, county Dublin.]

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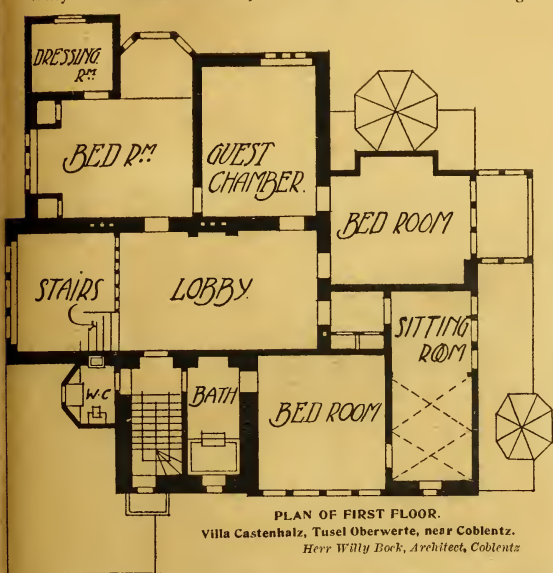
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In this issue we reproduce some further examples of Herr Willy Bock's characteristically German design, and we are



PLAN OF FIRST FLOOR.  
Villa Castenhalz, Tüsel Oberrwerte, near Coblenz.  
Herr Willy Bock, Architect, Coblenz

able to add plans which enable our readers to understand the peculiarities of German planning. It constitutes a typical example of the better class German Villa.

## HEATING BY HOT WATER.\*

Nowadays, when every building of any public importance is heated, and sometimes ventilated, by some so-called artificial system, *i.e.*, other than the old system of open fires, and when even private dwelling-houses of quite moderate size are more and more being dealt with in like manner, it is essential to the architect to be well acquainted with the various systems best adapted for this purpose, and to have at least a fair knowledge of the leading details and of the principles which underlie their application. Owing to the extent which heating by hot water, air, or steam has come into vogue, systems have multiplied and every possible variety, from the first-applied low-pressure hot water system to the latest development of the plenum system, or systems for the utilisation of the exhaust steam for heating. Each has advantages of its own which render it peculiarly adapted to given situations, and the ultimate success of an installation therefore largely depends upon the judgment and intelligence of the architect or engineer who has to determine which system of many shall be adopted. Taking it all round, however, it is pretty safe to say that for ordinary situations of small, medium, or average extent the earliest and best known system, hot water, either on the high pressure small bore system, or the more agreeable low-pressure system, have more than held their own in popularity and in economy there can be no doubt; for instance, that to heat a small or medium size church, hall, or school, the high-pressure small bore system has several considerations, notably economy, to recommend it.

The want of a comprehensive literature on the subject of heating and ventilation has undoubtedly been felt. Certainly one or two admirable little treatises on the plenum system and on steam heating have appeared, but we know of no comprehensive work specially devoted to hot water heating save Mr. Jones' work presently under consideration. The popularity of the work is attested by the fact that it has run

into three editions. It is a thoroughly practical text-book, as well as a work of reference for the general practitioner, and contains very much valuable information, in fact, that it is really needful for the architect, engineer, or building contractor to know.

Chapter xvii., on "Radiation," formed the subject-matter of a paper read before the Members of the Institute of Heating and Ventilating in London during 1903, and the Institute shewed its appreciation by awarding the author the silver medal for the best paper read during the session.

In the preface the author observes rather naively "his aim has been to assist the busy man by giving rules, tables, and formulas in a simple form, avoiding algebraic or mathematical calculations that the average engineer would not understand or appreciate!"

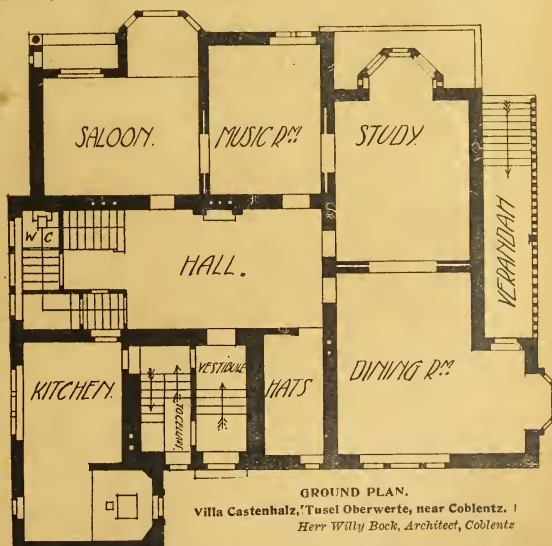
The work is admirably divided into self-contained chapters, which are made easily accessible by an excellent index, more than usually clear. The index of such a work as this is, in the majority of cases, strung together in the most slovenly fashion, and frequently almost worthless as an aid to speedy location of any point. A word of praise is due for the form in which the index in this case has been worded.

The author in his opening chapters deals with the high-pressure system, giving its advantages, causes of failure, and directions for working, together with tables of calculation.

The author vigorously combats the popular idea to which we have given expression in our remarks, that the high-pressure system is more economical and gives his reasons, which he claims entirely disprove that theory. and says that for ordinary temperatures in schools, churches, etc., no system has greater advantages and fewer disadvantages than the low-pressure hot water system. The latter portion of the statement at least is the undoubted experience of all who have had to do with these matters.

There is an admirable clear dissertation on the low-pressure system; many details, useful tables, and other information are added. Mr. Jones' book is the best on the subject we have yet come across, and we can thoroughly recommend it to our readers.

Messrs. Heinrich, Winby and Co., specialists in the construction of tall chimney stacks and boiler plants, have re-



GROUND PLAN.  
Villa Castenhalz, Tüsel Oberrwerte, near Coblenz. I  
Herr Willy Bock, Architect, Coblenz

ceived an order to construct a shaft and carry out boiler setting work for Messrs. Umney and Peckett, London, E.C. The new work is in connection with the machinery (Messrs. Easton and Bessemer) being installed at Messrs. Watney, Coombe, Reid and Co.'s Mortlake Brewery.

\* "Heating by Hot Water." Ventilation and Water Supply (Third Edition). By Walter Jones, M.I.C.E., M.I.Mech.E. London: Crosby, Lockwood and Son, 7 Stationers' Hall Court, Ludgate Hill.



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## THE CHARACTER OF RENAISSANCE ARCHITECTURE.\*

In our last issue we briefly considered an admirable essay of Mr. Reginald Blomfield on the French Renaissance, and we think it may, perhaps, be fitting in this issue to review another interesting work, entitled, "The Character of Renaissance Architecture," by Charles Herbert Moore.

Mr. Moore deals generally with what he calls that "great change in ideas and ideals which, after the remarkable, intellectual, and artistic life of the middle ages, was manifested in the fine arts of the Renaissance." Mr. Moore is not wholly an enthusiast; on the contrary, he maintains the superiority of the artistic development of the mediæval ages, as compared with the so-called Renaissance. This, he points out, is because architecture exemplifies the habits, life, and customs of the people. Thus, the mediæval art reflects the Christian spirit of the time, and, when that waned, the art which followed was of a correspondingly different type. The citizens of Florence (he quotes an old author, Villani) lived in mediæval times in sobriety and frugality. Towards the close of the fifteenth century, we know that luxury and extravagance prevailed, and as, indeed, we learn from some of our old English dramatists, such as Beaumont and Fletcher, vice and crime, as Mr. Moore puts it, flourished in high places,

and men sought to escape wholly from ecclesiastical and ascetic restraint.

Under such conditions, the Renaissance architect set himself to produce a luxurious and, what Mr. Moore terms, a specious style of architecture.

The fine arts of the Renaissance are in part a reflection, he says, of the decadent art of classic antiquity, and in part an expression of the something peculiar to Italian genius of the time.

Much of what Mr. Moore declares in his preface might have been written by an ardent disciple of Ruskin, Viollet-le-due, or William Burges, so sweeping are the statements, but they are refreshing to read after a surfeit of the somewhat extravagant laudation of the particular art of the Italian Renaissance, to which we have become accustomed during the past twenty years or so. Needless to say, his views are in many respects the very opposite of those of Mr. Blomfield, who scarcely hesitates to look upon the episode, as it is now generally the fashion to regard it, of the Gothic revival as an interruption, and not a sequence in the development of architecture. It is perfectly true that the Gothic revival, and all its teaching, are to all intents and purposes dead, but the general effect of that teaching can hardly be gainsaid. The revival was only an interlude, we may admit, but the effect of the teaching unquestionably remains. Mr. Moore, however, admits that the development of the Renaissance brought out and developed the individual, while the mediæval art was a communal effort, though one which was obedient to the institutions and life of the time. Much of his preface is devoted to a comparison between Mediæval and Renaissance Art, and comparisons, as we know, are always odious. He insists upon it, that Renaissance architecture was mainly a surface art, in many ways disregarding the form and structure. He observes, moreover, that the best art of the Renaissance was founded on earlier Christian art.

Mr. Moore goes far in his criticism, this contention as to the development of the architecture of the time being dictated purely by social conditions; but it is well to remember, on the other hand, that mediæval art in Italy never luxuriated, that it never was identified with the rational spirit and feeling, in the sense that such was the case in the northern countries of Europe, more particularly in France and England—Milan Cathedral, for instance, has a distinctively German character; and it might be said that the Italians seized the first opportunity to return to classical forms and details that presented itself. This is a consideration which Mr. Moore seems to somewhat disregard. In fact, his work may be roughly described as a depreciation of Renaissance architecture, and follows the strain very much of the writers of thirty years ago, such as George Edmund Streete and others. Streete, by the way, in his delightful work on Northern Italy, recounts that when he visited certain of the northern Italian towns, so engrossed in, and, we might say, possessed of the mediæval spirit was he, that he did not even trouble to visit several fine examples of Renaissance work, which he almost passed by, as unworthy of serious study. That is a spirit which does not prevail to-day, when taste is more catholic, and sees good in all that is intrinsically good, whatever period it may belong to, and adjudges it worthy of study, irrespective of style or date. The wisdom of that view is demonstrated very clearly in the failure to bring back to mediæval thought the artists of the Continental nations. The effort to force France to see art with mediæval eye was, despite the brilliant genius, and marvellous enthusiasm of Viollet-le-due and

\* "The Character of Renaissance Architecture," by Charles Herbert Moore, New York: The Macmillan Company, London: Macmillan & Co., 1905. Price 12/6 net.



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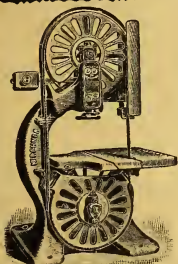
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other lesser men, nothing less than a fiasco. It was not that teachers were wanting, for, following in the footsteps of Viollet-le-duc himself, were many others, like Edouard Corroyer, who possessed a profound knowledge of, and loved for, mediæval art, but they failed to see that France, at least, was hopelessly out of touch with their ideals, and would never come back to the mediæval spirit. The subsequent history of modern architecture in France amply proves this. A very few churches, and some fine, but over reverent or scrupulous restorations, are the sole legacy of the revival in that country, while the modern school, which held so strongly to Renaissance forms, amply justified itself in, to cite one instance alone, the Grand Opera House in Paris, a universally admired and phenomenally appropriate structure. Had Le-duc and his school succeeded as well in France in enforcing their views, as Pugin and Ruskin in England, we should be without that fine building and many others. In other words, the clock cannot be set back in architecture, any more than in other arts or sciences, without ill effects.

Mr. Moore, however, while he depreciates, to a considerable extent, Renaissance art, and discounts its successes, is not a rabid Gothic enthusiast—fortunately for art, in the broader sense, that spirit is dead. Indeed, it is clear that many of his deductions, by which he shows mediæval influence, or points out the shams and discrepancies of the Renaissance contrivance are justified by the facts.

Unfortunately, space available here is too limited to follow him in his most interesting review of the Renaissance, and we must refer our readers to the work itself for the full value of his admirable descriptions of the development of the style. Suffice it to say that, to all interested in the history and architecture of the period, the scholarly work Mr. Moore has written is full of interest and of great value.

He gives a good account of the church architecture of the Florentine Renaissance, and a critical history of the Dome of St. Peter, and of the structure itself, with its details, and its offences against pure taste. Rightly enough, but somewhat too vigorously, he inveighs against the defects of construction. Speaking of the Dome, he says: "Although this great Dome has been almost universally lauded, it is entirely indefensible from the point of view of sound principles of construction." "A monument of structural error," he later on calls it.

Considerable attention is devoted to the palatial architecture of the period, and the criticisms, if somewhat pedantic, are in general true to an extent, and betray a keenly critical insight into general form and detail.

The Renaissance in England comes in for its share of criticism, and somewhat blindly the author loses sight of the fact that, despite all its defects, the Renaissance in England is the period, with the exception of the best period of the middle ages, to which the country owes its finest examples of architecture.

The work is admirably illustrated and produced.

## COMMENTS.

### The Master Builders and the Architects.

In this issue we publish a letter from the Master Builders' Association, written in reply to that from Mr. Orpen, published in our last issue. Mr. Good's rejoinder seems to call for some further explanation from the Institute, as the matter of the discussion of the

terms of the new conditions remains in considerable doubt, and it is not very easy to say as between the two statements whether the builders had or had not opportunity for discussion. The truth would, however, seem to us to be somewhere between the two, inasmuch as it is evident that the two parties have two different questions in their minds. What the architects appear to mean is that they invited the builders to submit for their consideration any statement they (the builders) desired to put forward, that not receiving any such expressions of views they deemed the matter at an end. The builders, on the other hand, when they say they had no opportunity of discussing the question, plainly mean that they received no invitation to a joint conference specially summoned for that purpose. This view was put forward at the general meeting of the architects which adopted the new conditions, but those who were chiefly concerned with the framing of the new conditions conveyed that they deemed a joint conference to be *infra dig.* A rather absurd view, we take leave to think. We are not presently concerned with the excellence or otherwise of the new conditions, but we fear it will be considered by impartial people, first, that if the builders desired a round-table conference there should have been one; secondly, that in passing the conditions without discussion, and without nine-tenths of the members knowing what they were adopting, the Institute placed itself in a false position, and one which calculated to excite ridicule on the part of outsiders. We trust that even yet some way may be found of amicably settling this difference, and better late than never summoning a joint meeting for full and free discussion.

The builders have so far shown a spirit of moderation in offering not merely to accept the British conditions, but also to adhere to the old Irish conditions which contain some fairly stringent clauses.

### The Architect for the New Technical Schools.

Elsewhere we publish an abstract of a discussion which took place at a recent meeting of the Dublin Corporation on the subject of the appointment of an architect for the new Technical Schools, which are to be built in Bolton-street on the site of the old European Hotel. The matter came up on a recommendation of a committee that competitive designs should be sought for from various architects. That, unquestionably, would be the proper course, the fairest to the whole calling of architects, and that most likely to obtain for the ratepayers the best possible value for their money. One of the members, Alderman Irwin, seemed to regard the suggestion as a slight upon the City Architect. We feel certain that that gentleman would himself be the very last to regard the matter in that light. There is no slight implied, so none could evolve out of so harmless a proposal. The City Architect is a hard-worked official, and has considerable responsibility and onerous routine duties to discharge, and it is fair neither to him nor to the local architects to compel him to undertake a design of such an important and troublesome character. If the Corporation invited designs from a number of architects, if the conditions were drawn up on equitable lines, then they would have the benefit of the thought and enterprise of a number of capable men. With a skilled assessor and an undertaking to employ the architect whose design was placed first by him, the Corporation would be tolerably assured of a satisfactory result. Such a competition ought, we think, in fairness to local practitioners, to be limited to architects practising in Dublin. There has of late years been a very strong tendency in the English provincial towns to follow this course, and, on the whole, with good results. It was felt that there was too great a tendency to rush off to London for an architect, while where there were open competitions, some of the leading London architects, to whom big competitions were matters of everyday occurrence, had acquired a certain facility in work of this class, so that they very often

walked away with the prize. It was felt to be a grievance by the local men, and from time to time efforts to combat it have been made. For instance, the other day in Northampton, where it is proposed to build a Public Library, towards which Mr. Carnegie has contributed £15,000, the local architects have sent a petition to the Mayor praying that a competition may be instituted. Their communication sets forth that "the proposed library building affords a fine opportunity of adding to the architectural features of the town, and we respectfully beg to suggest that to obtain the very best ideas both as regards convenience of plan and excellence of design the whole of the architects practising in Northampton should be invited to submit competitive designs."

Our contemporary, "The Architect," in commenting thereon, expresses the hope that "if Mr. Carnegie should hereafter decide about the erection of another class of buildings in addition to his libraries, we hope that as he has had the advantage of experience, he will stipulate that proper arrangements should be made about the designing of them. In a great many places the existence of architects has been ignored, and the plans have been prepared by hands that were accustomed to never go beyond arrangements for drainage." This latter criticism does not, of course, apply to Dublin, where we have a capable City Architect, who is really an architect by profession. Nevertheless, the principle involved would seem to be the same.

### THE R.I.B.A. EXAMINATIONS

Mr. Herbert Hodgson, A.R.I.B.A. (by exam.), sends us particulars of his system of preparation for examination, and, as he says, "there can be little doubt that in the near future, the passing of these examinations will be essential to success, and possibly to recognition in the profession." The matter is one of considerable importance. Dublin students have notably lagged behind, and for the advantage of students Mr. Hodgson has arranged a correspondence course, of which he gives full particulars in the pamphlet.

His courses of assistance in preparation for the examinations are arranged to suit all classes of students:—those who are just entering the profession and have ample time to work steadily through the Progressive Examinations devoting two years or more to each; those who, not having had favourable opportunities (or having failed to take advantage of them) have completed their pupillage without making the progress they now find essential to success, and wish to pass the examinations quicker than younger students; and those who are desirous of taking the Special Examination without passing the Preliminary or Intermediate.

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It seems to us to be of the first importance, if the architectural profession is to maintain its position, in opposition to the many agencies now at work against it, that students should be equipped with a thoroughly sound and scientific knowledge of their calling, in addition to facility on the art side. Few young men have sufficient persistency to follow up such a course as is implied by the R.I.B.A. examinations, without some external aid, and the help of an experienced "grinder" is therefore invaluable. The tendency in the profession has been far too much in the direction of either ignoring, or the trusting to luck and practice in acquiring a knowledge of newer methods of construction, and the more scientific aspects of building; with the inevitable result of opening the door to competition by constructional firms and others, who, if possibly deficient in the more artistic qualities, are, on the other hand, in touch with the latest developments. The result has been that, in London, for instance, architects have been ousted in many instances. In other words, architects must keep abreast of the times.



### ARCHITECTURAL ASSOCIATION OF IRELAND. JOTTINGS.

Our President has emerged safely through the mass of detail in which the scientists at the Congress of Public Health delight to revel. He has also survived the round of gaieties to which the hospitable Southerners treated their guests.

That the post of honour in the A.A.I. entails some considerable expenditure of time on the part of the fortunate recipient is indicated by the fact that our President had immediately to repack his bag and start for the excursion to England, which by the time these lines are in print will be practically over. The function has every appearance of being the most successful on record, and the number of members who will make the round trip is a proof of the soundness of the committee's policy in extending the length of the tour, and holding it during the week instead of at the end.

There are no statistics available as to whether architects are bad sailors, but if invocations to the clerk of the weather have any effect, the sea between Dublin and Liverpool on Tuesday night will be the calmest on record. A traveller in a warranted preventive of *mal de mer* would have done remarkably well if he had visited the Dublin architects' offices at the close of last week.

The Association paid a very interesting visit to the new Francis-street Markets on Friday last, over twenty members being present. The buildings have been presented to the city by the munificence of Lord Iveagh, and consist of clothes, vegetable and fish markets, with caretakers' quarters. Arrangements for disinfection have been provided, and the whole scheme has been modelled on the plan which is found to work admirably on the Continent. The buildings are designed in the Georgian style by Mr. F. Hicks, F.R.I.A.I., one of our ex-Presidents, and it is to be regretted that the exigencies of the purposes for which they were planned compelled them to be placed in a locality but little visited. The carving on the keystones was especially noticed, as being a departure from the ordinary stiff and conventional type, and Messrs. Sharpe and Emery are to be congratulated on the results of their carvers' skill. The wrought ironwork was executed by Messrs. J. and C. McGloughlin, and the cast-iron work has been provided by Messrs. Tonge and Taggart; indeed, all the materials possible are of Irish manufacture. The contractors are Messrs. McLaughlin and Harvey, Ltd., and their manager, Mr. Campbell, hospitably entertained the visitors to tea at the conclusion of a most instructive visit. Mr. Holloway, on behalf of the members, suitably thanked all concerned for the pleasant afternoon provided.

"WEE MACGREGOR."

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### THE PUBLIC HEALTH CONGRESS, CORK. The Engineering and Architectural Section.

At the Public Health Congress, Cork, held under the presidency of Mr. Joseph Holloway, "The Royal Commission on Sewage Disposal—Reports on Land Treatment," was the title of a paper read by Mr. Herbert T. Scoble, P.A.S.I., M.R. San. I.F. Met. Soc.

#### Sewage Disposal.

The present Commission started in May, 1898, and early in 1904 the report of their specially appointed officers were published on the subject of the land-treatment of sewage. The four blue books in question contain some 787 pages, plus tables, diagrams, etc., etc., and a digest of these was given by Mr. Scoble, after referring to the work of former commissioners and to the practice of the Local Government Board (England). Lack of space prevents our publishing the details of the eight typical sewage farms dealt with, but a note or two with regard to the various conclusions must be given. Both "storm water" and "street washings" may be so impure as to be, potentially speaking, as dangerous as sewage. A chemical standard was suggested, and the "resting" and "surplus" areas, respectively needed, touched on. "Too much stress cannot be laid upon the necessity of good management. Definite instructions in writing should be issued making the purification of the sewage the main (if not the sole) desideratum. The practice of letting sewage farms should be abolished." "From the bacteriological standpoint the effluents from sewage farms are not fit to discharge into drinking water streams, as the bacteria are not apparently modified in character, but are reduced in number only." A summary of the views given in the reports was followed by the author's conclusion, from which may be cited:—"It is impossible to say what treatment should be adopted in any one neighbourhood; the matter is one subject to the all-important consideration of pounds, shillings, and pence. To start with, the assumption that any one so-called "system" of disposal is the best for the district to be dealt with is to begin at the wrong end. There can be no doubt, however, that given land of suitable character, and of adequate area, it can, under good management, produce excellent results. The main report of the Commission dealing with the various methods of disposing of sewage has been, and is, awaited with interest, and if I might hazard an observation, it would be to the effect that both bacterial and land treatment (using as they do the same focus) are good, and that the employment of one or of the other is a subject to be settled under expert advice."

#### Water Supply of Dublin.

An interesting paper was also contributed to this section on the water supply of Dublin, and some contemplated improvements, by Mr. J. G. O'Sullivan, A.M.I.C.E., Deputy Borough Surveyor, Dublin Corporation. The author dealt with some interesting points in connection with the Vartny Waterworks, and pointed out the commendable zeal which has prompted the Dublin Corporation to enter on a project of improvement for the purpose of adding further to the storage at Roundwood, Co. Wicklow, by the addition of a new reservoir to impound a supplemental supply. The site of this new reservoir is about 25 miles from Dublin, and will be situated quite in the midst of the historic hills of Co. Wicklow. Its total length will be about 2½ miles, and very close upon one mile in width. Some 500 acres of land will be submerged by the construction of an impounding embankment over 2,300 feet long, across the valley, on the reach of the Vartny River, immediately above the existing reservoir. The greatest height of the embankment over ground level will be 51 feet, and the estimated contents, when full, will be about 1,500 million gallons, or about 4 months' supply, which quantity, when added to the existing storage capacity, will give 4,500 million gallons, or 10 months' supply, and thereby render the citizens of Dublin immune against any further trouble on the score of drought. The proposed new works will include the impounding, embankment, tunnel through rock about 70 yards long, diversion of river bed to the tunnel, erection tower 70 feet high, overflow weir 250 feet long, by wash 160 feet, two road diversions, and general mechanical works. The author has been associated with the City Engineer of Dublin in the preparation of this scheme, and they have been supported in a most laudable manner by the Council and the Waterworks Committee in the endeavour to provide for the City of Dublin an ample and wholesome supply of water.

A paper on "Refuse Disposal in 1906," by Councillor W. F. Goldrich, of Watford, was also read. It dealt at great length and in close detail with the remarkable progress which has been made during the past three decades in connection with the final and sanitary disposal of town refuse. Elaborate particulars as to the cost and efficiency of refuse destructors, and many instances of towns and cities, where destructors are being used with satisfactory results, were cited and explained.

#### Rural Housing.

Mr. R. O'Brien-Smith, M.I.C.E., read a paper entitled "Rural Housing," and there was a large attendance. Mr. O'Brien-

Smith, in the course of his paper, said the question of the housing of the labourers was a question of national importance, for it was an elementary fact that a prosperous, healthy, and contented peasantry is the backbone of a nation, and from this class is drawn the best material for the manning of armies and navies, and great industrial enterprises requiring hosts of brawny labourers. Mr. O'Brien-Smith went on to point out that England was to-day within measurable distance of the time when she will be without a peasantry to draw upon unless means be taken to stem the tide that is continually flowing from the agricultural districts. In Ireland the problem had been met, and to a great extent solved in the only fashion in which it was possible to attain practical, widespread, and substantial results, viz., by means of a local rate and State aid, to give effect to which Acts of Parliament have been passed.

### LATE BUILDING NEWS.

**Annamoe.**—Tenders will be invited for the Annamoe Dispensary for the Rathdrum Urban District Council. Mr. Geo. J. Moore, A.R.C.S.I., Assos. M.I.C.E.I., Foster-place, Dublin, architect.

**Cahir.**—Tenders have been received for reconstruction of a large residence for Henry Gale, Esq. Mr. F. W. Higginbotham, T.C., architect.

**Dublin.**—Estimates have been received for a scheme of cottages and foreman's residence for the Dublin Dockyard Co. Mr. F. W. Higginbotham, T.C., architect.

Tenders were received for five new shops for the Dublin Ice Co., and opened on the 10th inst. The work is to be started at once. Mr. F. W. Higginbotham, T.C., architect.

The contract for the Argyll Motor Factory, Pitt-street, Grafton-street, Dublin, has been given to Mr. George Scott, Estimate, £5,000. The work has recently been started. Mr. F. W. Higginbotham, T.C., architect.

The shop on North Strand for Miss Maher, which was stopped owing to the recent law suit over ancient lights, is now being completed. Mr. Moran, contractor.

The new premises in Mill-street for Messrs. Kraft and Horning are being started by Mr. Henry Monks, builder, who has just secured the contract. The front is to be a German design, on the owners' special instructions, who are Germans. Mr. F. W. Higginbotham, T.C., architect.

Extensive repairs are about to be started to the Orange Hall, Dublin. Mr. F. W. Higginbotham, T.C., architect.

Plans and specifications have been passed by the Corporation, and estimates are being obtained, for a large scheme of roads and houses for the Merchants' Warehousing Co. Mr. F. W. Higginbotham, T.C., architect.

**Johnstown.**—Tenders were received for water supply to this village from Messrs. Galvin, Rose, Dixon, Grace, Brady, and Kavanagh. The tender of Mr. D. Kavanagh

**Maynooth.**—Estimates are being obtained for a handsome gate entrance and lodge at Owenstown for W. McGrath, Esq. Mr. F. W. Higginbotham, T.C., architect, was accepted.

**Omagh.**—We understand the Governors of the Tyrone County Infirmary contemplate the fitting up of an electric light installation into the infirmary. The work is to be done as a memorial of the late Major Burleigh Stuart.

Alterations are about to be effected in the Record Court of the Courthouse.

**Rathdown Union.**—The tender of Mr. B. Dowd, Drury-street, Dublin, has been accepted for the erection of new lavatories for Rathdown Union. Mr. Geo. J. Moore, Foster-place, Dublin, architect.

**Shanbally (Co. Tipperary).**—Estimates are being obtained for two lodges on the estate of Lady Pole-Carew. Mr. F. W. Higginbotham, T.C., architect, 6 Lower Sackville-street, Dublin.

It has been discovered, after a minute examination, that a large part of the outside stonework of Westminster Abbey is seriously decayed, and repairs have just been commenced which will take about five years to complete. A start has been made on the clerestory of the north transept, and extensive scaffolding is being erected. Inside, a boarding has been put up to prevent falling debris from injuring visitors. A high scaffolding has also been erected for the repair of the buttress on the west side of the north façade. Recently a piece of carved stone which supported one of the statues fell to the ground. The decayed soft Bath stone is to be replaced by Portland stone, which is better adapted to withstand the ravages of London's smoke-charged air. Mr. Micklethwaite, the well-known church architect, is supervising the work.

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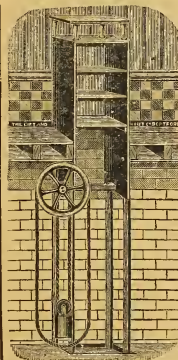
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**Ballycullane.**—Tenders are invited for the erection of a teacher's residence near the new railway station, Ballycullane. Applications to be made to Very Rev. T. Canon O'Connor, P.P.

**Cork.**—The Council of the County Borough of Cork have received proposals for building and erecting New Concert Hall and executing sundry alterations to School of Music, Union-quay, Cork.

Tenders were received for improvements and repairs to St. Nicholas' School, Cork, according to plans and specification of Messrs. W. H. Hill and Son, 68 South Mall.

**Dublin**—At a meeting of the Corporation, the Technical Education Committee sent up a report in reference to the selection of an architect for the proposed new Technical Schools in Bolton-street, in which the Committee requested permission to seek competitive designs for the building. The Lord Mayor said there was a feeling of deep dissatisfaction throughout the city in regard to the manner in which the Technical School building had been delayed. He had received several letters asking him to do something that would accelerate the proceedings in order to provide employment for those who needed it. It was really too bad that the Corporation should lose time haggling over the appointment of an architect. He implored the Council to do something at once, to start work which would give employment to the skilled trades in the city that were crying out for it. Alderman Irwin said they all agreed that it amounted almost to a scandal that there should have been so much delay in the taking possession of the Bolton-street site. They were at the present moment, apparently as far from getting possession of the site as they were the day when the Council selected the site. There was some question as to title, and he feared it would involve troublesome legal proceedings. The building was going to cost £40,000 of the citizens' money, and he should protest against £2,000 of public money being expended upon an outside architect, while the Corporation had in their employment an architect as competent as any one that they could select (hear, hear). But the question of the architect was not the most important; the real question was, when was the work to be begun? (Hear, hear). He asked the Council not to ignore their own City Architect. The report was adopted.

**Glanmire.**—The Rev. T. Shinkwin, P.P., received tenders for execution of necessary repairs to the Presbytery, Glanmire, caused by recent fire. The architect is Mr. M. A. Hennessy, 74 South Mall, Cork.

**Portadown.**—PORTADOWN AGRICULTURAL AND RECREATION SOCIETY, LTD.—Tenders were received for the erection of a grand stand, main entrance, gates, sheds, and paling.

**Skibbereen.**—Tenders will be received for building a residence, stables, and offices, Townsend-street, Skibbereen. The architect is Mr. Arthur Hill, B.E., M.R.I.A., 22 George's-street, Cork.

**Sligo.**—We notice with pleasure that Mr. Allison Sim, brother of Mr. Alexander Sim, who has done so much for the employment and fame of Collooney and County Sligo, has been hard at work for the past four months completing an enterprise which promises to eclipse anything yet started in the West of Ireland, namely, a large brick, tile, and pipe factory. We learn that he has the smallest detail settled, and expects to begin the erection of the extensive works the second week of July. The starting of the works will be a great boon to Sligo and the West of Ireland generally, giving extensive employment, as well as providing building material at a cheap rate. We have seen some of the bricks made from the clay in that neighbourhood, and certainly they would be hard to beat. We wish Mr. Sim every success in his enterprise. We want more men of his character and energy in the country.—"Sligo Champion."

**Tullamore.**—The guardians of this union received tenders for the erection of sanitary annexe and plumbing work to Fever Hospital at the Workhouse, according to the plans and specification prepared by the architects, Messrs. Batchelor and Hicks, F.S. R.I.B.A., 86 Merriion-square, S., Dublin. E. J. Graham, Clerk of the Union.

The guardians of the above union received tenders for the erection of an operation room at the infirmary of the Tullamore Workhouse, according to the plans and specification prepared by Mr. A. V. Ashe, C.E.

## VELURE.

To many of our readers the name "Velure" is well known, inasmuch as they have used the paint to which this name has been given, and to them, therefore, it does not require any introduction. But as there are probably many others who have not yet become acquainted with the unique merits of this paint, we have much pleasure in describing for them some of its principal features. We may at the outset remark that we ourselves have had ample experience of "Velure," and that we can personally vouch for all the advantages claimed for it by the makers. The most remarkable characteristic of this paint is the beautiful finish it gives when it is properly applied. It produces a smooth, velvety surface of great brilliancy, excelling in this respect any enamel or varnished paint with which we are acquainted. This property is conspicuous in all colours, but is particularly so in white "Velure." So much is this the case that we have never met anyone who has used the white colour or has had work done for them with it who was not more than delighted with the result. From the point of view of cost, which is always an important one, "Velure," though high-priced, will be found conducive to economy. It is claimed, and with reason, that one coat of it equals two of paint and one of varnish. This, in itself, is a highly important consideration, and it is considerably enhanced by the extraordinary covering properties of "Velure." It has been used in some of the largest painting and decorating contracts in England, the Colonies, and elsewhere, and in every case where information is forthcoming the contractors have testified to their surprise at the saving on the quantities estimated as being required for the work. Notable instances of this were the painting contracts of Waterloo Hotel, London, and Sydney (N.S.W.) Hospital, both large buildings, but the last-named an especially magnificent structure. The contractor for the Sydney Hospital, Mr. David Tate, expressed his intention of using "Velure" as the finishing coat in all his work, at the same cost as for ordinary paint work. Another property of "Velure" is its elasticity. The makers send out as samples strips of tin painted with one coat. These can be bent in all directions without producing the slightest crack or chipping in the paint, and if the tin is held close to a fire the "Velure" will scorch, but does not blister or crack. Possessing these qualities, it follows that "Velure" is excellent both for inside and outside work on account of its appearance and durability. It retains its surface free from flaws or cracks, and is easily kept clean, as it can be washed like china with a wet cloth, no scrubbing with soap or soda being necessary. Owing to its lasting qualities it is largely used for painting yachts and launches, and its power of resisting heat makes it a favourite paint for baths. "Velure" can be had in all tints, and samples and quotations can be had from the makers, Messrs. C. Chancellor and Co., 13 Clerkenwell-road, London, E.C., or from the Dublin agents, Messrs. Brooks, Thomas and Co., Ltd., Sackville-place.

A valuable speciality also manufactured by Messrs. Chancellor is Stripso, a preparation for stripping paints, enamels, etc., from wood, metal, and other surfaces. Stripso will also remove rust, grease, and smoke stains, and can be employed for cleaning paint without injury to the latter.

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# ENGINEERING SECTION.

## ITEMS.

It is a curious fact, constantly to be noted, that serious accidents to the travelling public occur in groups. Quite recently those who travel by rail and by tram have received a warning that, in spite of the present high development of engineering skill, perfect safety is by no means assured. The lamentable disaster at Highgate, when an electric tram got beyond control on a steep incline, is only one of a series of similar accidents to which attention has been recently drawn. By reason of the loss of life and serious injury caused, it has occupied more notice in the Press, but the whole series is attributable to the same origin, inefficient brake power. The tram is invariably descending a hill, the brakes refuse to act, and a complete smash ensues. In many cars reliance is placed on a mechanical and power brake, but it is obvious when the former fails or jams, and the vehicle gathers speed, the trolley will jump and the power brake be rendered useless. That is to say, the more urgent its necessity the less likely it will be available for use. Another brake of the mechanical slipper type is fitted to many cars, and the Board of Trade has urged its general adoption. One thing is obvious, that present methods are often faulty, and with the ever-extending electrification of tram routes, the augmenting of speed, and with the increase in the size of cars, more stringent regulations are necessary.

The Great Northern Railway Company recently demonstrated the efficacy of the brake power on their Hill of Howth cars to such an extent as to reassure the Dublin citizens. A tram was permitted to gain a speed of twenty miles on a sharp declivity, and control was immediately regained in a distance but little over its own length. We understand that three brakes are fitted to all these cars, and the care with which they are run is to be seen in the perfect immunity from accident during the five years the route has been open.

The Salisbury railway disaster comes as a rude shock to the British railway world, and the sad loss of life occasioned to so many American visitors, who had just landed on our soil, for some time to come prevent our outspoken criticism of railway management in the United States. The cause of the accident has not been satisfactorily ascertained, and with the death of the driver and fireman of the express train evidence will be difficult to obtain. It will probably be found in a combination of a dangerous curve and an excess of speed. There is little question that a most searching enquiry will be held by the Board of Trade. Meanwhile the larger railway companies will take the dreadful lesson to heart, and remember that safety is of far more importance than speed, for the latter is a luxury that can be too dearly bought.

The Royal Commission on Sea Erosion has now been appointed, and Mr. P. O'Brien's inclusion as representing Ireland will be welcomed. The present Government has certainly lost no time in taking the preliminary steps to gather the necessary information about many matters which have for long been in abeyance. The Canals and Waterways Commission, the Arterial Drainage Commission, the Royal Commission to consider the lighting of the coasts, and this new Commission should keep the engineering world both interested and instructed for some time to come, and result in reorganisation of the greatest benefit to the Three Kingdoms. We also understand that the question of appointing a Commission to deal with the much-discussed subject of Irish railways is also under consideration, but for the present it would appear there are enough irons in the fire if each is to obtain its proper meed of attention.

When opening the new electrical power station at Brighton the President of the Local Government Board cooed as gently as any sucking dove. He said that though

the pessimist might howl and the niggardly complain, the solid fact remained that, in the United Kingdom, they had municipally the best governed people in the world, and from the point of view of the probity of our Civil Service and the efficiency of the staffs, speaking broadly and generally, the most disinterested group of councillors that could be found anywhere in the world. These qualities had to be qualified by the fact that the rates were high. If they were the best governed, it might be true that they were also the highest rated, but good roads and streets were not to be obtained, slums removed, parks and open spaces, libraries and all the adjuncts that an intelligent community had a right to expect, provided for them without paying for them. The above is a text, especially from such a source, that might with advantage be studied by ratepayers nearer home than Brighton, whose criticism of municipal management is in direct proportion to their desire for economy, and who labour under the delusion that improvements can be created by a wave of the wand.

The Congress of the Royal Institute of Public Health has terminated, and possibly the most interesting paper read was the inaugural address by Dr. Windle, who dealt with the two serious evils in Ireland, the increase of tuberculosis and the number of the insane. These are subjects which are very pertinent for the consideration of those who listened to the address, as was also the question whether the local authorities are doing all that is in their power to stem the tide of disease, and taking all the advantage that can be derived from the Public Health Acts, Housing Acts, and other enactments, which have from time to time been passed with a view to improving the health of those whom the authorities have been elected to watch over.

It is unfortunate that the Congress this year attracted much less public attention than on former occasions, more especially because such gatherings are of great benefit when held in Ireland, giving an impetus and interest in the study of questions which are often rather inclined to be overlooked. It is possible the public is becoming surfeited with Congresses, and that the most eminent engineers and scientists find the calls upon their time are too frequent to enable them to prepare papers and take part in the discussions. We think it a distinct matter for regret that the Engineering and Architectural Section received such limited support, having regard to the frequency with which professional men in this country urge that their claims are overlooked in favour of "imported" architects and engineers. We commented upon the fact that neither of the leading institutions sent their Presidents to the Congress, nor were their officials represented amongst the Vice-Presidents. It is to be noted, further, that out of the scanty number of papers, six, which were included in the programme, only one was by an Irish representative, Mr. Alfred D. Price, of the Local Government Board, which department, by the way, contributed three Vice-Presidents to the section. The papers read were—"The Royal Commission on Sewage Disposal," "Reports on Land Treatment," by Herbert T. Scoble, P.A.S.I.; "Microbe and Mud: the Bacteriological Aspect of the Sludge Problem," by John F. Lord, Bacteriologist to the Malden and Coombe Urban District Council; "The Provision for Storm Water in Sewage Works," by George B. Latham, A.M.Inst.C.E.; "Defects in the Upkeep of Small Water Supplies," by Alfred D. Price, M.A.I., M.Inst.C.E.; "Factory and Domestic Smoke Abatement," by John B. C. Kershaw, F.I.C.; and "Refuse Disposal in 1906," by W. F. Goodrich, whose book on the subject has become recognised as one of the standard authorities. In addition to the above official list Mr. O'Brien Smith, of the Local Government Board, read an essay on "Rural Housing," and Mr. J. G. O'Sullivan, A.M.I.C.E., contributed an interesting paper on "Proposed Improvements at the Vartly Waterworks." We hope to deal with the more important of these contributions



in future issues; in spite of every effort made to obtain a precis from the Congress officials, none have so far been forthcoming.

The most interesting feature, locally, of the proceedings was the paper read in the Section of Bacteriology and Chemistry by Major R. Jackson, R.A.M.C., in the course of which he made a vigorous attack on the quality of the Cork water supply. He said that generally speaking sanitation in the garrison towns in the South of Ireland is at a low ebb; the condition of Cork, like that of most of our larger cities, leaves much to be desired in respect of many of its poorer dwellings, its drainage system, and its drinking water supply. It is certain that a great quantity of unfiltered water finds its way into the supply, and from the history of its source and the results obtained by himself and others from repeated analyses it must be concluded that this river water is quite unsuitable and dangerous to use for drinking purposes. By this paper, which showed that the author had carefully made himself up in the details of his case, public attention in Cork has been arrested. The subject of water supply has, for years past, been a vexed one in the city, and it reached an acute stage during the last twelvemonth. By a large expenditure material improvements have recently been established, and the public was beginning to feel reasonably secure. Major Jackson has now flung the apple of discord, and the result was quickly observable in the ensuing meeting of the Public Health Committee, at which the City Engineer described Major Jackson's remarks as wild and ill-conditioned. When the subject is brought before the Waterworks Committee, it may confidently be anticipated that rebutting evidence will be forthcoming.

Whether the scientific side of the Congress may or may not be considered as successful as in former years, there is no question that the traditions of Irish hospitality were thoroughly upheld. Every evening was filled with some form of entertainment designed by the Corkonians for the amusement of their guests, and, as an English delegate recently informed us, he had not a dull moment from the time he set foot in the city.

#### THE ELECTRIC INSTALLATION AT THE INTERNATIONAL EXHIBITION, 1907.

It will be remembered that the Buffalo Exhibition, held but a few years ago, was considered to be the apotheosis of electricity. The buildings were outlined with hundreds of thousands of variously-coloured lights, and coloured fountains played continuously after sunset, the beams from powerful search-lights turning them into veritable diamond showers. The sudden switching on of the lights, with which the electric tower was covered, was one of the chief sights of the Exhibition, and formed a wonderful object lesson of the achievements of the electrical engineer in the sphere of external decorative illumination. The International Exhibition to be held in Dublin next year is altogether on a smaller scale; therefore, comparison with the larger American expositions is unfair, and, indeed, impracticable. But even at the present chrysalis stage there is plenty of evidence to indicate that the electrical plant which is to be installed will be not the least interesting feature even to the casual visitor; to the engineer it will be especially instructive, owing to the arrangement by which the work of the various types of dynamos may be observed and compared.

The power-house will be in accordance with the most modern ideas as to plan and construction, but at present the details have not been finally decided upon.

The generating plant will consist of seven dynamos of distinct types, four of which will be steam-driven, and three direct coupled to gas engines. The steam will be generated from two Babcock and Wilcox water tube boilers at 150 lbs. steam pressure, capable of developing 1,400 h.p. The boilers are to be fitted with condensing plant.

The first unit consists of a compound vertical engine with the dynamo placed between the high and low pressure cylinders, which design, owing to the shortness of the shaft, gives excellent balance. It will be manufactured by Coombe,

Barbour and Company, Belfast. The dynamo will be a 350 K.W. Westinghouse machine, 500 volts. This unit will be the "slow speed" unit, and is similar to the type installed at the Ringsend Tramway Power Station and at the Pigeon House for the Corporation.

The "high speed unit" will consist of a compound enclosed engine of the Belliss type (which has recently been placed in the Pigeon House Power Station as a standby) with forced lubrication, direct coupled to a 400 K.W. Westinghouse dynamo, 240 volts.

There will be in addition to the above, two 100 h.p. engines built by Workman and Yeames, of Belfast, direct coupled to dynamos manufactured by the General Electric Company, Limited, running at 530 revolutions.

The remaining three dynamos will be direct coupled to gas engines, one of which, by reason of its size, being a special feature. It is being built by the National Gas Engine Company, Limited, Ashton-under-Lyne, and is a horizontal type, two-cylinder engine of 350 h.p. It will be worked from the ordinary town gas. Crossley Brothers will exhibit a 150 h.p. horizontal gas engine, and it is anticipated that the Wexford Engineering Company, Limited, will install one of their engines, of which we may publish a description later. All current, except that generated by the slow speed unit will be 240 volts.

The switch-board, as designed, is 25 feet long, and each of the seven dynamos will have its own panel, fitted with voltmeter, shunt regulator, circuit breaker, switches, and fuses. The panels will be of polished marble, mounted on steel frames. For exhibition purposes all the plant, with the exception of the slow speed unit, will be arranged to run in parallel, or separately on their own circuits if required. The distribution section of the switch-board is designed with a panel for each circuit, each of the circuit panels being fitted with ohmmeter and the necessary switches and fuses. By this means the output can be readily analysed, and the various types of machines compared. The mains will all be placed underground, and will probably be of armoured cables, and they will feed 700 arc lamps, 600 of which will be 10 ampere open type, and the remainder flame lamps erected around the ornamental lakes.

The principal buildings are to be outlined with 7,500 incandescent lamps of 8 and 16 c.p. In addition to the lighting, provision has been made for 300 h.p. electric motors to drive the machinery exhibits, water-chute, etc. The foundations for the installation are already in hand, and it is expected the whole of the plant will be in working order by January, 1907, as the light will be required for the internal finishing of the Exhibition and for the placing of the exhibits. The whole of the installation is being carried out by Messrs. Wm. Coates and Sons, Limited, under the direct superintendence of Mr. Dashwood. It is a noticeable feature that the engines are being obtained from Belfast, Dublin, and Wexford, so that the Exhibition will be very representative of the work that can be turned out by Irish firms.

#### ROYAL VICTORIA INFIRMARY, NEWCASTLE ON TYNE.

Messrs. Doulton and Co., Ltd., have supplied, amongst other fittings for the infirmary, special bath valves and bed pan sinks. A short description of these may be of interest.

The valves are their Patent Mixing Valves in gun-metal, with removable keys, and with inlet to discharge through side of bath. They are arranged so that the water can be delivered at any temperature by a slight movement of the hand. It is impossible to turn on the hot water first, the valve giving first cold and then tepid, and this is a safeguard against scalding.

There are also a large number of special bed pan sinks with a scalding sink and drainer combined. These are made in white glazed fireclay, and are fixed on cantilevers. The bed pan sink has a rising jet for the bed pans and a spray for the urine bottles. These are connected by copper pipes to hot and cold screw-down valves. The sink itself is flushed by a vitreous enamelled syphon cistern.

## RIGHTS TO LIGHT AND AIR: HOW ACQUIRED AND LOST.

By W. JOHNSON ROBERTS, Solicitor.

(Special to *I. B.* and *E.*)

Before further considering the question of rights to light and air, it may be well to know that where the right to light is claimed under a grant, that grant must be by deed. If an attempt be made to confer an easement by writing not under seal, all that the grantee will get will be a license, as he would if the privilege were granted by word of mouth, he will not get any vested and perpetual right entitling him to continue its use and enjoyment against the will of the grantor.\* This shows the necessity where any important concession or grant to light is given of it being in writing under seal, or, in other words, by deed.

It has been shown how a right to light may be acquired by continuous user for twenty years (in practice 19 years and 1 day), and by grant express or implied.

In order to obtain the benefit of the Prescription Act the user must be continuous over a period of twenty years. It may be lost during that period if at any time it be interrupted for twelve months, or it may be suspended if the owner of the dominant and servient premises is one and the same person. In this case, however, it revives on the ownership of the premises being served.† It may be lost even after the right has accrued under the Prescription Act—(a) *By express release*, as where the owner of the dominant tenement surrenders his right to the owner of the servient tenement. (b) *By Act of Parliament*: extinguishment of easements frequently occurs by Act of Parliament in connection with railways and other public works, but in all such cases compensation to the party aggrieved is provided for. (c) *By abandonment*: a right to light may also be lost by abandonment. Lord Ellenborough says: "Where a window has been shut up for twenty years the case stands as though it had never existed." But we must not deduce from this that it is necessary in every case to prove non-use of a right to light for 20 years before the law will hold that it has been abandoned. In the comparatively recent case of *Stoke v. Singers*‡ (1857), the owner of a house in which there were ancient windows, which had been blocked up by him for a period of nineteen years, was held not to have abandoned his right by so doing. Of course, a mere temporary non-user would not be held to be abandonment. Modern legal opinion seems to favour the view that the mere efflux of time during which the right was unused, is not so important in determining the question as to whether or no it has been abandoned as to the doing of any act which would exhibit an intention to abandon the right. Chief Justice Denman, in a case concerning easements, states: "We apprehend that as an express release of the easement would destroy it at any moment, so the cesser of use, coupled with any act clearly indicative of an intention to abandon the right, would have the same effect without any reference to time. It is not so much the duration of the cesser as the nature of the act done by the grantee of the easement, or of the adverse act acquiesced in by him, and the intention in him which either the one or the other indicates which are material for the consideration of the jury. The period of time is only material as one element from which the grantee's intention to retain or abandon the easement may be inferred against him; and what period may be sufficient in any particular case must depend upon all the accompanying circumstances." Many cases will, no doubt, occur to my readers in which such intention would be presumed against the owner of the dominant tenement—e.g., building up the windows, altering his building in such a way that light could no longer pass through them, or by permitting the owner of the servient tenement to do so. The chief point to bear in mind when considering cases of abandonment of easements is the intention of the party who did or acquiesced in the act which it is alleged showed an abandonment of the right. This is of equal, if not of more, importance than

the mere lapse of time, which, after all, as has been judicially stated, is only one factor in the case. (d) *By alterations in the buildings of the dominant owner or in those of the servient owner when acquiesced in by the former.* This branch of the subject has been exhaustively discussed in the ruling case of *Tapling v. Jones*, decided in 1865 in the House of Lords.\* Prior to this important case the law was held to be that where the owner of the dominant tenement increased his easement over the servient tenement, e.g., by putting in larger or additional windows, he thereby lost the right to the light that he had previously acquired. *Tapling v. Jones* completely reversed this view of the law, and decided that as the opening of new windows was in itself a lawful act, the existing rights of the person so doing were not jeopardised thereby. Lord Chelmsford's judgment in this case is particularly clear. Although it is not possible within the limits of this article to quote largely from it, yet I cannot refrain from giving the following extracts:—"The owner of the privileged window does nothing unlawful if he enlarges it, or if he makes a new window in a different situation. The adjoining owner is at liberty to build upon his own ground so as to obstruct the addition to the new window, or to shut out the new one; but he does not regain his former right of obstructing the old window, which he lost by his acquiescence, nor does the owner of the old window lose his former absolute and indefeasible right to it which he gained by length of user." Again, in the same judgment: "It must always be borne in mind that it is no unlawful act for the owner of a house to break out a window, although in the latter case some difficulty may be thrown upon an adjoining owner to distinguish the old part from the new, and so to ascertain which part he has to obstruct and which is privileged from his obstruction. The alterations may be of such a nature (as in the present case) as to make it impossible for him to prevent the further restriction of his liberty to build on his own premises, without at the same time interfering with the right previously acquired against him. Yet it would be a very strange extension of the law of forfeiture to hold that the owner of an ancient window, doing nothing but what he may lawfully do, loses his existing right, because it stands in the way of interfering with an act against which the owner of the adjoining land would otherwise have been able and would have been entitled to defend his property." Again: "It may be said (and this was urged in argument at the Bar) that unless such is the law, a person who has an ancient window may acquire a right to any number of additional windows, by so contriving their position as to place them completely under the protection of the ancient window, and thus effectually prevent the adjoining owner's interference with them. Undoubtedly, this is a very possible case, and yet there does not appear to be anything unreasonable or unjust in denying, even under such circumstances, a power to the owner of the ancient lights which did not previously exist. . . . The adjoining owner can, therefore, always protect himself by a little vigilance; and if he allows rights to be acquired, under shelter of which he is prevented using his land for the purpose of defence against acts of his neighbour, he must blame his own want of foresight and precaution and not the law, which will not permit an ancient right to be invaded upon any such assumed ground of necessity."

It should be borne in mind that *Tapling v. Jones* decides that the extension or attempted extension of an existing easement of light does not destroy said existing rights. But, of course, if the owner of the dominant tenement, say, for example, rebuilds his premises and opens new windows, all of which are located differently from the ancient ones, the new windows can be obstructed by the owner of the servient tenement. Moreover, such an act would be held to be an abandonment of the previously existing ancient lights.

(e) *By alteration of the plane at which light is admitted.*

\* Per Bayley, J. *Hewlins v. Shippam*. 5 B. & C., p. 229; *Goddard's Easements*, p. 4.

† *Siniper v. Foley*, v. J. & H., 535, (1862.)

‡ 26 L. J. Q. 357, (1857.)

\* *Tapling v. Jones*, 11 H. L. C. 290; 34 L. T. C., p. 342 (1865).



The leading case on this is the *Nat. Prov. Plate-glass v. Prudential Asse. Co.*,\* which decided that alteration of the plane of the original building did not destroy the easement so long as the windows or apertures through which light flowed were practically the same or had substantially a similar location. In his judgment in that case, the Master of the Rolls, Sir George Jessel, says: "I am at a loss to see why putting back a window, which has enjoyed light for twenty years (supposing the planes of the windows to be parallel), should effect an absolute surrender of the right which, but for the putting back, would have existed. Such a conclusion seems to me to have no reason or commonsense to support it. And if putting back on a parallel plane will not work a forfeiture of the right, why does putting back the front at an angle do so? I confess that I see no reason for the proposition."

(f) *By advancement of a wall or building.* Scott v. Pope† decides that the advancement of a wall in which ancient lights are situated will not lose the right to light, provided substantial portions of the old windows are included in the new apertures. The fact that a wall is moved back or advanced does not *per se* alter the right, although by either operation it may be lost, if after the building has been moved the light which formerly flowed through the old windows cannot pass through the new. The structure might be so entirely different, or the alteration of the frontage line—by moving it back for a distance of 100 yards, for instance—might be such that practically and substantially no portion of the old light was enjoyed by the new windows.

The methods by which rights to light may be acquired and lost have now been considered rather fully, and I now propose to discuss shortly what constitutes an infringement on a right to light such as to justify the interference of the law. Up to the year 1904, when the most important case of *Colls v. Home and Colonial Stores, Ltd.*, was decided in the House of Lords‡ the trend of the decisions was that any interference, be it ever so slight, whereby the light to which the owner of the dominant tenement was entitled was diminished constituted sufficient grounds for the interference of a court of law. Lord Macnaghten, in his judgment in that case says: "I am of opinion that the owner or occupier of the dominant tenement is entitled to the uninterrupted access through his ancient windows of a quantity of light, the measure of which is what is required for the ordinary purposes of inhabitancy or business of the tenement according to the ordinary notions of mankind, and that the question for what purpose he has thought fit to use that light or the mode in which he finds it convenient to arrange the internal structure of his tenement does not affect the question. The actual user will neither increase nor diminish the right. The single question in these cases is still as it was in the days of Lord Hardwicke and Lord Eldon—whether the obstruction complained of is a nuisance." In the same judgment it is stated Kelv v. Pearson shows "that in ordinary cases a person does not necessarily acquire a right to all the light which he has had for twenty years. He may have had more than he reasonably required either for domestic or business purposes; and in that case his right is limited to the amount of light reasonably required." On the other hand, in the same case, Lord Lindley says: "There is no rule of law that if a person has 45 degrees of unobstructed light through a particular window left to him he cannot maintain an action for a nuisance caused by diminishing the light which formerly came through that window.§ But experience shows that it is generally a fair working rule to consider that no substantial injury is done him where an angle of 45 degrees is left to him, especially if there is good light from other directions as well."

A very important matter to be considered in dealing with questions of light and air in cases where they admittedly have been interfered with is what action a Court is likely to take on the facts, whether it will order the buildings causing the obstruction to be demolished or will merely mulct the offender in damages. Roughly speaking, the rule seems to

be that where substantial damages can be recovered at law an injunction in equity ought to follow.

Sir George Jessel says: "Whenever an action can be maintained at law, and really substantial damages, or perhaps I should say considerable damages (for some people may say that £20 is substantial damages) can be recovered at law, then the injunction ought to follow in equity, generally, not universally, because I have something to add upon that subject." Further on his lordship stated: "If I had found by the evidence that there was in this case a clear instance of very slight damage to the plaintiff—that is, some £20 or £30 or £40, but still very slight—and a very large material, substantial damage to the defendant, I should be disposed to hold that that was a case in which this Court would decline to interfere by injunction, having regard to the new power conferred upon me by Lord Cairns' Act to substitute damages for it."

It may be well now briefly to recapitulate what I have already said. Rights to light and air arise either by Prescription, *i.e.*, 20 years' continuous user, or by express or implied grant. If by express grant it must be by deed, if by implied grant it may be implied from the circumstances of the case. Twelve months' interruption during the period of twenty years will prevent the right from accruing. Or, if the owner of the dominant and servient premises is one and the same person, the accruing of the right will be suspended during the continuance of the unity of possession. If the right has accrued, it may still be lost (a) by express release or surrender; (b) by Act of Parliament; (c) by abandonment; (d) by alteration in the buildings of the dominant owner or in house of the servient owner when acquiesced in by the former; (e) by alterations of the plane at which light is admitted which prevent it having access to the apertures through which it previously flowed; (f) in certain cases by advancement or setting back of a wall in which ancient lights are retarded.

*Colls v. Home and Colonial Stores, Ltd.*\* (House of Lords) marks an epoch in the law of rights to light and air. It practically decides that where premises have, after the alleged infringement, still what light is required for the ordinary purposes of habitancy or business, according to the ordinary notions of mankind, no action will lie. This, from a builder's or house owner's point of view, is a most important matter. The fact that unless there is a substantial material injury done to existing rights of light, courts will not grant a mandatory injunction should be borne in mind. Where a man has only suffered a comparatively trivial injury, the law will not allow him to put the party causing the injury to expense altogether out of proportion to the harm done.

Now, considering the above from a practical point of view, it is apparent that it is a matter of prime importance for every architect and builder, before commencing work on any new building or making any alterations on an old one, to consider how far the works in hand will affect existing rights. If it is clear to him that the light of adjoining premises will be injuriously affected by what he is about to do he should, as well as possible, ascertain what legal right the owner of the light so affected has to its enjoyment. How long that enjoyment has existed, and how it arose, whether by prescription or grant. If he arrives at the conclusion that a legal right to the enjoyment of the light exists he should next consider how far his works interfere with its enjoyment, and whether the interference is of such an extent as would warrant an injunction at law compelling him to take down or stop the buildings he was erecting, or whether damages only would be awarded, or whether the injury would be so slight as to be beneath the dignity of a court of law. A careful perusal of this article will, it is hoped, enable any architect or builder to arrive at a sound conclusion on these points, and either fearlessly to carry his work to a conclusion or make such compromise either by cash payment or alteration in design as will meet the views of the party injured.

Messrs. Tullis, Ltd., of Clydebank, have recently installed a complete set of their laundry machinery at the new home for nurses at the Bethnal Green Children's Hospital, which was opened by the Lord Mayor last week.

\* 6 Ch. Div., 757, (1877-)

† 31 ch. D. 554 (1885).

‡ L. R., H. L. (1904), A. C. 179; L. R., C. A. (1902), 1 ch. 302.

§ 24 L. T. 890; L. R. 6 ch. 809.

\* Thead v. Debenham; L. R. 2 ch. D. 165.

**THE DRY EARTH SYSTEM.**

Wherever there is a difficulty about the constant supply of water, the dry-earth closet system comes in most usefully. Provided the pattern of closet used is a really good one, nothing could be better than the dry-earth system, which is clean, healthful, and convenient.

Mr. G. Bradley, the Connaught Villas, Wick-road, Hampden Wick, England., sends us particulars of a dry-earth closet he manufactures.

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The labour involved in tending these closets is small. They are complete, self-contained and portable, and are admirably adapted for use in military stations, farms, isolation hospitals, houseboats, etc.; in fact, wherever a cheap, convenient, and easily arranged sanitary installation is needed. There is a complete absence, moreover, of objectionable smells; while the first cost from 30s. upwards, complete, is so reasonable as to offer very exceptional advantages.

**ENGINEERING NEWS.**

**Cork**—The Cork County Council has accepted the tender of Messrs. O'Connor and Martin, of Riverstown, Co. Cork, and Drogheda, Co. Louth, for the enlargement and extension of the Castletownberehaven Pier. This firm were also contractors to the Council for the enlargement and extension of Courtmacsherry Pier, and executed the work in a highly satisfactory manner. Mr. R. W. Longfield, County Surveyor for the West Riding, prepared the plans and specifications in both cases.

**Greystones**.—**LIGHTING**.—Dr. Edgar Flinn, Local Government Inspector, held an inquiry at Greystones with reference to the request of the Rathdown (No. 2) Rural District Council to invest them with the powers possessed by Urban District Councils under Section 80 of the Public Health (Ireland) Act, 1878, in regard to the public lighting of the townlands of Killinacarrig and Rathdown Lower. The proposed areas of charge for providing and maintaining the public lamps are the townlands mentioned. The cost of providing these lamps is estimated at £243 12s., and of maintaining them at £115 annually. The estimated poundage rate for the providing of the lamps on the area mentioned is 6-19d. in the £, and for maintaining them annually 2-92d. in the £. The Inspector, in opening the inquiry, said that he had received a letter from Mr. Samuel H. French, of Greystones, who said he represented forty objectors to the scheme, representing a valuation of £2,500, who could not understand why the Council wanted to light country roads and force this scheme. They viewed with alarm the continued increase of taxes, and held this scheme could be very well postponed until such time as Greystones became large enough to be a township. Mr. C. P. O'Neill, solicitor, said the inquiry was granted on the joint application of the Sanitary Authority and the ratepayers who had assented to this scheme. There were 99 assentors, whose valuation was £3,052. There were 22 oil lamps, which had been erected by the Greystones Improvement Association, who were willing to vest them in the Rural Council free of charge. The original scheme was to provide 58 new oil lamps, but there was an alternative scheme which reduced the lamps from 58 to 32 spirit lamps, which would make 54 in all, as the 22 existing lamps would be refitted with incandescent spirit lamps of 100 candle power. Mr. O'Neill said the Inspector would find that the number of dissentors was only 37 as compared with 99 assentors with a valuation of £3,052. The valuation of the objectors was only £1,328. The cost of the new scheme would be 5d. in the £, and the maintenance 1½d. in the £, which was less than the sum mentioned in the Council's advertisement. The new system existed at Claremorris, where the "Best" (Cincinnati) spirit lamp was successfully used. It was lit by motor oil evaporating from a reservoir holding two days' supply. Twenty-one hours' light would cost 6d. It was believed it would work out efficiently and well. The lamp was then produced, and it was indicated on the map the positions in which the new installations were to be applied. Mr. Patrick Joseph Kinlan, Rural District Council, said he had obtained the "Best" lamp from Ohio, and had got 21 hours' light for sixpence, and it was as good as the best light in Dublin. The system at present proposed was an excellent one, and should be carried out in the interest of the inhabitants.

**Londonderry**.—No. 1 RURAL DISTRICT COUNCIL.—The above Council received tenders for carrying out certain drainage works at Killea Graveyard. Mr. M. A. Robinson, C.E., Richmond-street, Derry, is the architect.

**Mallow**.—The Board of Guardians received tenders for the improvement of the sewerage at the workhouse.

**IMPORTS****PORT OF DUBLIN**

June 24, per City of Stockholm, from Rotterdam, 321 cases window glass, J. Dockrell, Son and Co., Ltd.; 20 cases window glass, McCulloch and Nairn; 18 cases window glass, J. Hall and Son; 155 cases window glass, Brooks, Thomas and Co., Ltd.; 25 cases window glass, Arigho and Son; 251 steel joists, 51 cases nails, 6 cases limestone, to order.

June 25, per City of Cadiz, from Hamburg, 1,898 cakes asphalt, 20 rolls roofing, to order; per Ville d'Eu, from Treport, 600 bags plaster of Paris, to order; per Lady Roberts, from London, 1,000 sacks cement, T. Dockrell, Son and Co., Ltd., a quantity timber, to order.

June 26, per Result, from Belfast, 180 tons bricks, etc., H. and J. Martin, Ltd.

June 27, per Abington, from Ghent, 5,975 bags cement, to order.

June 28—Per City of Stockholm, from Rotterdam, 2 cases window glass, to order; per Wingo, from Göteborg, 6 cases glass, 3 cases wood, to order; per The Queen, from London, 650 tons cement, T. and C. Martin, Ltd.; per Enid, from Glasgow, 100 tons bricks, etc., J. McFerran and Co.

June 30, per G. Player, from Ghent, 7,488 bags cement, to order; per Barbro', from Christiania, 101,100 pieces flooring boards, 4,498 pieces scantlings, 1,739 spars, T. and C. Martin, Ltd.; per Elizabeth Hyam, from Chester, 100 tons bricks, T. Archer.

July 2, per Catherine Latham, from Belfast, 127 tons bricks, H. and J. Martin, Ltd.; per Aeron Belle, from Belfast, 100 tons bricks, H. and J. Martin, Ltd.

July 3, per A. W. Kafemann, from Danzig, 1,056 pieces redwood timber, W. L. Crowe, to order; per Elidir, from Newcastle, 800 tons cement, J. C. Johnson; per Lady Wolsley, from London, 1,800 sacks cement, T. Dockrell, Son and Co., Ltd., 50 pkgs. lead, T. Dockrell, Son and Co., Ltd.

July 4, per Velinheli, from Port Dinorwic, 100 tons slates, W. and L. Crowe, Ltd.; per Lady Hudson-Kinahan, from London, 194 pcs. marble, E. S. Glanville.

July 6, per Belfast, from Baltimore, 756 bdles. firewood sawn, 21 poplar logs, 1,847 pcs. oak lumber, 418 tons roofing slate, to order.

July 7, per City of Belfast, from Antwerp, 540 joists, 3 cases limestone, to order; 30 cases window glass, W. Collins; 25 cases window glass, T. Dockrell, Son and Co., Ltd.; 50 cases window glass, Hoyte and Son; 113 cases window glass, J. Arigho; per Jessie, from Glasgow, 100 tons bricks, McNaughton and Co.

July 9, per Mary P. Mitchell, from London, 340 tons cement, 5 tons whiting, Brooks, Thomas and Co., Ltd.; per Lady Roberts, from London, 26 pkgs. lead, Brooks, Thomas and Co., Ltd.

July 10, per City of Brussels, from Ghent, 4,694 bags cement, to order; per Daisy, from London, 320 tons cement, Wallace Bros., Ltd.

Mr. Geo. Metcalfe, Quantity Surveyor, has sent us notice of his removal to new offices in College Park Chambers (late Tarpey's Hotel), Nassau-street.

In the description of the "Eclipse" Gas Lamp, which appeared in our last issue, the illustration given was that of the in-door lamp, though the letterpress referred mainly to the out-door lamp. The out-door "Eclipse" lamp is exactly similar in appearance to an electric arc lamp.

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HEAD OFFICE

JULY 28, 1906.

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## TOPICAL TOUCHES.

In this issue we publish some interesting particulars of the International Congress held last week in London, together with a *resume* of some of the more important papers.

Mr. Peter B. Wight (Editor of the *New York Fireproof Magazine*) says that in America, grille foundations on yielding soils are just superseded by concrete piers, built in tubs, down to hard pan or rock.

The Urban Council of Tralee require the services of a Surveyor, whom, we are glad to note, must bring proof of his qualifications, either by previous experience in that particular avocation, or as an architect or civil engineer. The person appointed will be required to devote practically his whole time to the duties of the office. The salary offered is £200, and full particulars are given in our advertising columns.

M. Jean Gilson, of Brussels, in a paper read before the Architectural Congress, declared that "it would be highly desirable to see the Press bestow on the architects a little of that interest which it lavishes upon painters, sculptors, musicians, and writers. In the same way as the Muses are sisters, are not the Arts brothers?"

M. Gilson went on to say that "if *The Press* would second our efforts, what a glorious *educative* part it would play! It could interest and instruct the public by publishing judiciously written articles, commenting upon and bringing before its readers the qualities and merits of the *works* which are really worthy of such name."

But must not the Press first learn to know good from bad architecture? The Frenchman intuitively discerns the merits of breadth and dignity in a great public building, even if his taste is at times, though not always, vilely vulgar as regards the smaller domestic work, whereas the Englishman nearly always has some sort of feeling for the pleasant, quiet domesticity of modern rural architecture, and will not tolerate blatant vulgarity, while he seldom or never attempts to understand or pass an intelligent opinion on a great public edifice. How many Londoners are really proud of Somerset House?

Mr. Walter Young, District Auditor, in his audit of the accounts of the Acton Council, disallowed an item of £1,500 paid in fees to the architect of the Town Hall and Public Offices' scheme, which was rejected by the Local Government Board on the ground of extravagance, the cost being £100,000.

It is inconceivable that the Local Government Board should have power to perpetrate what is seemingly on the face of it a gross injustice. If the architect prepared drawings and specification he was entitled to a fee of  $2\frac{1}{2}$  per cent. on the estimated outlay; £1,500 only works out to  $1\frac{1}{2}$  per cent., or a little over the  $1\frac{1}{4}$  per cent., generally recognised as the standard charge for preliminary sketch designs. If the work was properly done by the architect, the Council were bound to pay him, and he could compel them to discharge their obligations. Therefore, it is difficult to see on what reasonable grounds the auditor's action was taken.

The tender of Mr. P. Dowd, Drury-street, Dublin, has been accepted for the Foxrock main drainage. The amount is slightly over £6,000.

The Belfast Naturalists' Field Club have just terminated a visit to Donegal, where, under the guidance of its archaeological section, it visited the old abbey and the castle.

The Belfast Naturalists' Field Club have passed the following resolution:—"Resolved—That the Belfast Naturalists' Field Club respectfully and earnestly request the County Council of Donegal to take the necessary steps to secure vested powers over the ruins of the Franciscan Abbey, known as Donegal Abbey, and also over Donegal Castle, with a view to their preservation, as their historical associations render them worthy of being placed on the list of the National Monuments of Ireland."

Next week the annual conference of the Master Builders' Association of Great Britain and Ireland will be held in Dublin. In addition to the more serious business of the congress, the lighter side, that of social intercourse and the exchange of the pleasant courtesies of life, has not been overlooked. On Wednesday a garden party will be given in the Royal Zoological Gardens, Phoenix Park, and on the evening of the same day a dinner will take place in the new hall of the Gresham Hotel. We hope in our next issue to give a full report of the proceedings.

On Tuesday last the chairman and members of the Executive Committee of the Irish International Exhibition were accorded a view of the new buildings, now well advanced, in Pembroke Park. The majority of those present were astonished at the remarkable progress made with these buildings, which bid fair to be ready in good time for the opening next year. After the inspection the company, which included Press representatives from many quarters of the globe, were entertained with a most bountiful hospitality. Elsewhere we give a more detailed account.

On the 8th prox. the great new Town Hall, Belfast, will be opened by his Excellency the Lord Lieutenant. The Hall, of which we have already published illustrations, may be named as perhaps the most important municipal building in the Kingdom erected during recent years. The architect who has been privileged to see this fine conception of his realised within his own time is Mr. A. Brunwell Thomas, of London. In view of the exceptional importance of this occasion we intend publishing a special supplement in our issue of the 18th prox., together with a considerable number of views from some beautiful photography specially taken by Mr. R. Welsh, of Belfast.

Somewhat contrary to expectation, save to those behind the scenes, Mr. Bryce on Monday night last moved to add to the Irish Labourers' Act, a new clause setting forth, that every person appointed as architect, engineer, surveyor, or clerk of works to a District Council, must satisfy the Local Government Board that he has sufficient knowledge and experience to carry out the duties of his office. This clause was opposed by Mr. Redmond, but ultimately accepted. The step is one of some importance, and elsewhere we comment thereon. It is the first instance we can recall such State recognition of an architect's qualifications, save in the case of permanent officials.



## THE INTERNATIONAL CONGRESS OF ARCHITECTS, LONDON.

The Congress opened on Monday with a reception by Mr. John Belcher, President of the Royal Institute of British Architects, at the Grafton Gallery, when an immense number of members attended. The weather was all that could be desired, and the membership totalled nearly 2,000, including ladies—indeed, to the Irish architect it was a revelation that so many architects existed. Ireland was not strongly represented, but amongst those attending we noticed Mr. W. M. Mitchell, President of the Institute; while Mr. Anthony Scott, Mr. Arthur Hill, Mr. F. Batchelor, Mr. Strahan, Mr. A. E. Murray, Mr. F. Hicks, and Mr. R. M. Butler were also present.

Later in the day, at the Guildhall, a brilliant function took place, H.R.H. the Princess Louise and the Duke of Argyll presiding. There was an immense gathering, but, owing to the impossibility of hearing and the extreme heat, many members of Congress left before the conclusion of the proceedings.

The great feature of the Congress was the splendid fashion in which it was supported by the foreign members, the number of delegates from France and Germany being most remarkable.

In the evening on Monday the members were entertained at a reception by the President of the Royal Academy of Arts, when there was a brilliant and fashionable gathering. The reception was, of course, held in the Salons of the Academy in Burlington House, and the year's exhibition of paintings afforded much interest.

On Tuesday several trips were arranged, the chief of which was that to Hatfield, the seat of the Marquis of Salisbury. Hatfield is only 25 minutes' run by train from King's Cross, and the park gates are opposite the railway station. The front is somewhat disappointing, bald and lacking interest. But the interior of the house and the garden front are truly charming. With the delightful garden and the rich colouring of the old house there is a picture that appeals to everyone with an eye for the artistic, and as a typical example of the great English Jacobean manor house must have appealed to our foreign friends. The mansion was built between 1607 and 1611. The early years of Queen Elizabeth were spent at Hatfield, and here she received the news of her accession to the throne. In 1603 James I. gave the older mansion to Sir Robert Cecil, younger son of Elizabeth's Minister, Lord Burleigh, in exchange for Theobalds. He it was who built the present house, which has ever since remained in the possession of the Cecil family. The facade is supposed to have been designed by John Thorpe (1570-1610). The central tower bears the date 1611. The interior is notable for its splendid suite of State rooms, the grand staircase and the long gallery, 163 feet in length. The plaster work and the wood carving are interesting.

Simultaneously with the visit to Hatfield, another big party went to that delightful old-world palace of Cardinal Wolsey, Hampton Court. Owing to going to Hatfield, your representative, not being a descendant of Sir Boyle Roche's classic bird, did not attend, chosing Hatfield in consequence of never having been there before. The excursion was, however, a delightful one. Hampton Court, happy hunting ground of the Cockney, and mecca of the architectural student, of course, far exceeds Hatfield in interest and sheer beauty, and "the stranger within the Englishman's gates," who chose it for his visit, had no reason to regret his decision.

The features and history of this truly beautiful place are so well known, even to Irish readers, as to need no repetition here. Suffice it to say, of its history, that built by Wolsey, it was presented by him to Henry VIII. in 1526. Several English Sovereigns, including the greatest of them all, Oliver Cromwell, resided here; but it is with William III. that it is chiefly associated. He, it was, who pulled down some of the old work, and caused the fine facade, the fountain court and other works by Sir Christopher Wren, to be built.

On Tuesday and following days some interesting papers were read and discussions took place, brief reports of some of which we publish.

In the evening the Lord Mayor of London gave a con-

versazione for the members of the Congress, large numbers of whom attended at the Mansion House. The chief interest of Wednesday was the visit to the gardens of Buckingham Palace. To those who had known the Palace from the Green Park front only it was almost inconceivable that such vast grounds (about 43 acres in area) should exist in the very heart of a great metropolis. Those who often depreciated the poor and mediocre front facade, the garden front, with its simple and dignified classical lines was quite a surprise. The original house, of which the garden front forms part, was designed by John Nash (1752-1835). The front facade was designed by Edward Blore.

From Buckingham Palace the visitors went to Westminster Abbey, where the Very Rev. the Dean met them. Quite evidently our foreign confreres, particularly the representatives of France, were impressed with the beauty of the grand old Abbey. Those amongst them who knew it from photos only had, perhaps, hardly realised that England possessed so grand an interior. But Henry VII.'s chapel, in its ever-changing, ever-fresh and verdant grace and beauty of detail, seemed to impress them most of all, for it is so totally unlike anything to be seen in the various countries of the Continent; and it is novelty, or rather change, that the traveller most thirsts after. The French Flamboyant style certainly affords a distant parallel to the English perpendicular, but long before the English had wrought the full perfection of that pleasing and ornate, even if debased period, the French had ceased to attach any vital importance to Gothic, and had become bitten with Italian renaissance or revival in architecture, the arts, manners and morals, and not always to the advantage of either the one or the other.

From the Abbey the visitors separated, the larger party going to Messrs. Doulton's works at Lambeth, and another, almost equally large, to Messrs. Holloway's, the contractors' works. Once again your representative had to make his choice, and this time he certainly had no reason to regret it. Doubtless, Messrs. Holloway could have displayed, as they did, in point of fact, many admirable examples of the modern builders' art; but at Doulton's works there was plenty to rejoice the architect's heart. Passing aside the more purely utilitarian showroom exhibits of sanitary goods, each admirable of its class and perfect in finish of construction and mould, with the latest operative fittings, completed in a fashion of the highest excellence. From the showrooms, where, by the way, the members of Congress were most hospitably entertained by the Messrs. Doulton to varied refreshments, they were conducted through the various operative modelling departments, a treat which one and all declared they "would not have missed for worlds." Here we saw exemplified the truth of the Biblical adage and smile, "as clay in the potter's hands;" here was seen at work the potter's wheel, little changed from the time of Holy Writ, but so deftly manipulated as to cause wonder. Every vessel emanating from Messrs. Doulton's works seems the subject of careful and anxious artistic thought. The patterns on the highly-glazed ware we know so well are produced by the direct impression of the natural leaf, or strip of lace, prior to burning. Every room of the department is under the charge of a lady well versed in the details of the art, and capable of imparting the theory of the work to others, of whom each lady has a regular staff.

Proceeding to the modelling department, the members of Congress saw much beautiful work in process of conception and realisation. Here your representative had the privilege of being introduced to the veteran artist, George Tinworth, whose splendidly-conceived modellings of sacred subjects have been for generations the delight of all who love art for art's sake. The fine devotional effect and technique of George Tinworth's work have placed him in the very forefront of those who model in clay. During many years past, the fortunes of George Tinworth, and the great commercial house of Doulton, have been identified. During his life's span almost, Tinworth has worked for the Messrs. Doulton. What might have been his present position in the world of art, had he launched forth as a sculptor, is not hard to say; but now by the fortunes of the house he stands or falls.

The whole process of the production of faience, or ma-

jolica ware, is full of interest in every detail. From beginning to end there is abundant proof that the workers proceed on an artistic, not a mechanical, basis—the true impress of nature in the foliage, and bird life portrayed, being obtained through direct natural, but conventionally limited, impress.

Before the visitors left, Messrs. Doulton presented each with a pretty little specimen of their work, in the shape of a flower vase. At the conclusion of the visit, the "Father" of the party, a Scottish architect, who had been over fifty years in practice, proposed, and Mr. Anthony Scott, of Dublin, seconded a vote of thanks, heartily supported by a French delegate, to the Messrs. Doulton for their kind and hospitable entertainment, and for the quite evident desire made to make the visit instructive, as well as pleasant, to all. In particular was mentioned the name of Mr. Marshall, who, with various coadjutors, worthily represented the firm on the occasion. Needless to say, with what hearty and sincere acclamation the proposal was adopted.

On Thursday evening the Royal Institute of British Architects hit upon a very happy idea for entertaining the members of the International Congress. They invited them to a garden party at the Royal Botanic Society's Gardens. This party was held on Thursday, and of all the entertainments and receptions of the week none has been more thoroughly appreciated. Not only were the gardens effectively illuminated for the occasion, but several special attractions were also provided. On the slope beneath the trees, Mr. Patrick Kirwan's "Idyllic Players" delighted the visitors with their performance of "A Midsummer Night's Dream;" on the lawn the band of the Royal Horse Guards played a selection of music, and in the conservatory the Ladies' Salon Quintet gave a performance. During the first hour Mr. John Belcher, A.R.A., the president of the Congress, held a reception in the conservatory, and shook hands with the representatives of all the nations of Europe, besides many visitors from the United States and the Colonies. On Friday the members of the Congress visited the Universities of Oxford and Cambridge, and on Saturday they brought their proceedings to a conclusion with a farewell banquet.

On Friday the members of the International Congress of Architects, assembling at the Grafton Gallery, turned from practical discussion to the fascination of archaeological lore—a quality very apparent in a description by Mr. Cecil A. Smith of the process of reconstructing the entrance to the Tomb of Agamemnon or Treasury of Atreus at Mycenæ from fragments that have come into the possession of the British Museum. Since the beginning of the last century the Museum has from time to time acquired small pieces of the columns flanking the doorway and of other portions of the structure, and various conjectural drawings of its original appearance have been attempted from the slight data available. But it was not until the recent discovery in the Marquis of Sligo's collection by the Earl of Altamont of some fragments of columns suspected to belong to the tomb that the work of restoration could be undertaken with certainty. The importance of the discovery was at once recognised by Mr. Cecil Smith, who after careful examination, much ingenious deduction from contemporary examples, and the fitting of pieces of pattern into their due position, began their restoration. The completed result was illustrated on many beautiful lantern slides which he exhibited. The columns, of which some important pieces were acquired, are 18 feet 3 inches in height, and are decorated with a bold pattern. As Sir Henry Howarth remarked, the decoration is of a kind which, while increasing the dignity and beauty of the columns, does not diminish their appearance of solidity, and he wondered why modern architects have not adopted this method of treating pillars. The pattern is of an Egyptian type, and is probably attributable to the intercourse between the Cretans and the Egyptians. One of the most remarkable characteristics of the columns is that they taper downwards. In former suggestions for restoration the thin ends have been placed uppermost, but it is now definitely established that the position was reversed. By way of explaining this peculiarity, Mr. R. Phene Spiers, who occupied the chair, remarked that it was a repetition of the method of dealing with wooden supports by the early builders, who knew that the columns would lose none of their

supporting power in the reversed position, while they would suffer less from weather and would provide a broader surface for carrying the heavy lintel over the doorway. In this position they take their capitals in a fitting manner, and present in combination with other features of the tomb a very impressive appearance. Several other architectural peculiarities, including the niche over the lintel, the decorative purpose of which is still uncertain, were dealt with by Mr. Smith, whose paper was much appreciated.

## THE EDUCATION OF THE PUBLIC IN ARCHITECTURE.

Address by Mr. JOHN BELCHER, A.R.A., President, R.I.B.A., President, Seventh International Congress of Architects, London, 1906.

The first step, as so often is the case, will be for the public to unlearn much that has been wrongly learnt. The superstitions of antiquity and the "styles" must be exploded. It must be made plain that neither a smattering of archaeology nor a superficial study of styles affords a sound basis for a critical judgment in matters of present-day architecture, which must be presented to the eyes and ears of men as a living art, founded upon past achievements, it is true, but instinct with a power and vitality of its own.

Neither is architecture merely a matter of a beautiful exterior; the importance of the "plan" of a building and of sound principles of construction must be pressed home. In other words, architecture is a science as well as an art, a blending of the two in such a way that the practical knowledge of the builder or engineer is interpenetrated by the artistic spirit, and made without prejudice or loss to subserve its ideals.

Instruction of a positive order will range itself under the three heads of Principles, Qualities, and Factors.

The principles of architecture are two, Truth and Beauty. Truth requires that a building, both in its entirety and in its several parts, should never seem to be other than it really is.

This excludes all pretence of antiquity where no such claim exists.

It requires that a church should look like a church, a town-hall like a town-hall, and a private residence like a private residence.

An external shell of plaster over brick must not present the appearance of blocks of stone, nor a steel structure cased on terra-cotta suggest solid masonry.

Good architecture never deceives the eye even for a moment. There must be no false suggestion as to the purpose or construction of the building, nor any hiding under one external feature that which is usually expressed by another.

The principle of truth, however, finds its widest scope in the true use of materials.

Every material has essential characteristics of its own, and therefore a proper place and purpose in building. There is a time and a use for stone and for each kind of stone, for wood and for each kind of wood, and so on.

To defy, neglect, or misuse the natural qualities of materials is not good architecture. These natural qualities will be roughly indicated under the head of Factors.

Beauty is the second great architectural principle. Its elements do not admit of popular exposition, but the public may be trained to recognise its presence by the appeal that it makes to their imagination and emotions. The fact that beauty can be felt, but not (ordinarily) analysed, is of importance in the education of the public, as tending to withdraw their attention from mechanical rules to the spirit that animates and pervades, like a living thing, the highest architecture.

An appreciation of beauty of form is less common than susceptibility to colour effects, and needs training and development.

The qualities that distinguish good work from bad may be classed as follows:

**Strength.**—It is not sufficient that a building be, in fact, strong and secure; it must look so; it must satisfy the eye.

The engineer may by exact mathematical calculation know that the conditions of security are amply fulfilled, but the architect has to see to it that the work presents an appearance of strength and solidity. The larger and heavier parts must be below; every arch must have suffi-



cient abutment or even a tie-rod as well; solids when placed over voids must be strongly supported, and so on.

Methods of support and resistance must be clear and well defined.

Granite in the upper storey of a half-timbered house may, as a matter of fact, be quite safe, but it *seems* to threaten danger; placed below, it satisfies the eye with its impression of solidity.

*Vitality.*—Evidence of life and growth, most plainly illustrated in Gothic work, where the perpendicular lines rising heavenward and clothed (as it were) with luxuriant ornament suggest the life of a tree or plant.

It is vitality that gives ever fresh combinations and effects from the same primary elements.

*Restraint.*—The limitation of means to an end, the suppression of all unnecessary parts or details.

Whatever be the nature of the building, there should be purpose, definite purpose, in every feature or ornament.

This may be illustrated under the head of Proportional Divisions (see Factors); but the general principle is one which will be readily grasped by the intelligent layman, to whom it will often suggest a line for thought and inquiry.

*Refinement* is impossible without restraint, but it includes also purity of form and perfection of material.

Everything must not only be the best of its kind, but so suited to its purpose that Nature will seem to have expressly designed it for that use and place.

The fitness of certain materials and forms for defined purposes and effects is subject-matter for an important chapter in the education of the public.

*Repose.*—Every really good work is clothed, as it were, in an atmosphere of repose. There is a sense of power, but it is latent power; there is evidence of vitality, but it is restrained vitality.

Effects too pronounced hurt the eye; ornament too profuse wearies both the eye and the emotions. There must be no "loud" or vulgar elements.

*Grace.*—A dignified seriousness of purpose should be observed in the appearance of all public buildings, but an expression of the graceful courtesies of life should not be lacking. In domestic buildings this element of grace takes a more prominent place, and assumes a higher and more refined form, corresponding to the tender sentiments of home life.

The public interest ought to be readily roused in this direction, and a demand created for a better class of small suburban residence.

*Breadth.*—The treatment of the subject as a whole in a simple grand manner, the proper massing of the several parts, the subordination of detail to the larger forms of the composition and to the bringing of the whole design into unity.

An attempt may be made by illustration and comparison to explain this somewhat technical term, that the public generally may be led to understand and appreciate this quality of breadth which is so conspicuous in every great architectural work.

*Scale.* The right relation of the several parts to one another and to the whole in point of size.

It will be pointed out that there are different scales in architecture as in music, and that the varying effects upon the mind and heart are as powerful and distinct in the one case as in the other.

Also that the scale should be appropriate to the character and purpose of the building. A building of a monumental character or of great public importance should be designed and built on a large scale, and each part and every moulding should be of a proportionate size.

*Factors.*—In dealing with factors—the means which the architect has to his hand, as it were, for the attainment of his ends—it will be necessary to emphasise the fact that most, if not all, of these factors have their origin in utility, and answer some practical need in the construction or preservation of the building.

To forget this primary purpose and use them as means of artistic embellishment is to sacrifice use and convenience to artistic ideals, and is not true architecture.

The public are quick to recognise the importance of this in respect of window and door openings, floor divisions, chimneys, etc., but are apt to think of columns, pilasters,

sills, hood-mouldings, cornices, and perhaps even buttresses as decorative rather than useful, and to suppose that the architect has a free hand in the disposition of them. Education in this matter will include instruction in the primary use of purpose of the common architectural forms, and will give an insight into the difficulty of making these forms serve the ends of use and beauty at one and the same time.

Such an insight—like propounding a problem—will go far to quicken interest.

The subject may be dealt with under the four heads of Proportion, Light and Shade, Solids and Voids, Balance and Symmetry.

*Proportion.*—Certain proportions are pleasing to the eye, and effects of proportion are obtained by the relative size of different parts.

The various ways in which the constructional parts and features of a building may be utilised to obtain proportional divisions, both horizontal and perpendicular, might be described in detail.

*Light and Shade.*—The advantage that may be taken of effects of light and shade might also be pointed out.

*Solids and Voids.*—The importance of a right adjustment of solids and voids, both in respect of size and position, would come next.

How easily a false scale may be set up, and a building made to look insignificant, by broad sheets of plate glass in the windows.

*Balance and Symmetry.*—These give a very distinctive character to a building, and aid in setting forth its special purpose. There is or can be rhythm in architecture, as in verse.

*Material.*—The right use of the various kinds of material furnishes an interesting and useful subject for public instruction.

The general principle having been laid down that every kind of material has its special characteristics, and should be treated accordingly—in other words, that its very best should be got out of it—a brief account of the natural qualities of the chief building materials (stone, wood, metal, bricks, plaster, etc.) would follow.

The following leading thoughts are appended by way of illustration:—

When stone and brick are used in conjunction, the former should be accorded the more honourable parts—e.g., quoins, architraves to doors and windows, sills, cornices, etc.

Granite, even if it could be carved for mouldings, should be used rather for strength and solidity than for ornamental features.

When the beauty of marble or wood is in its figure or colour, it is best exhibited in the form of slabs or panels; if moulded, the forms should be large.

Stone is granular, wood fibrous: each has its appropriate forms and mouldings, suggested by the natural qualities of the material.

Wrought metal admits of the finer and more delicate forms, metal cast in moulds naturally assuming a more bulbous shape. Both kinds have their appropriate place and effective use.

Well-known examples of wrought-iron and cast-iron gates and railings afford interesting illustrations.

The foregoing summary indicates the main lines along which the education of the public in matters architectural should be developed.

Whether in public lectures, or in articles published in book-form, illustrations should be abundant.

There are signs of a wave of public interest in architecture which "taken at the flood" may become permanent and lead to great results.

## THE EXECUTION OF IMPORTANT GOVERNMENT AND MUNICIPAL ARCHITECTURAL WORK BY SALARIED OFFICIALS.

By OTTO WAGNER, Imperial and Royal Superintendent of Works; Professor of the Imperial and Royal Academy of Plastic Arts.

[On behalf of the Society of Austrian Architects.]

It will be convenient to give first a clear definition of the word "architect" and also some explanation of the process

of development of the architect, because all the differences of opinion are more or less rooted in the wrongful acceptance of these conceptions.

With regard to the way in which the architect is developed, it must be taken into consideration that artistic capacities, such as manual proficiency, imagination, taste, individuality, and a certain gift for invention, are faculties which the architect must possess in his quality as an artist, but which cannot be learnt. On the other hand, there are a general culture and a technical and constructive knowledge, which the architect must also possess, but which can be acquired by study.

The amount of scientific knowledge to be acquired by the architect has reached such vast proportions that it has to be divided into parts, consequently into branches of knowledge. For this reason alone it is not possible for the young man who wants to become an architect to acquire full knowledge of all these special branches, since the time at his disposal, and the intellectual receptivity of the individual, are limited.

The architect, during the whole of his professional activity, will cultivate first of all the region of art, which nowadays, even in literature, has become of a very wide range. But as at the same time he is expected to have full knowledge of all technical innovations, his technical and scientific education should extend so far that he will be able to understand the essence of the sciences and their progress, and that this understanding will enable him in his practical work to put the results of human progress at the service of art.

His technical education must, moreover, enable him to choose the proper methods of construction and the most convenient materials to be employed. Nay more, his knowledge, aided by his inborn inventiveness, must enable him to combine new forms of construction, or to vary existing ones so that they shall answer fully the purposes for which they are required. From this it follows that the practical work and experience which the architect gains in the course of his career must be based upon a sufficiently wide knowledge.

Only after having acquired a complete technical education, can the question be decided whether the aspirant to the profession of an architect possesses those inborn qualities from which may be anticipated success in following this career.

There is, therefore, a sharply marked limit in the course of education of the architect. This limit, as already said, lies naturally between the acquired complete technical education and the entering into an academy of plastic art.

It is the duty of the academy, or rather of the professors teaching in such an institution, to examine and to decide whether or not the student possesses the inborn faculties enumerated above.

It cannot be too strongly recommended to such professors to use the utmost severity in this examination, because the result of it will have a great influence upon the general artistic standard of the profession, and because it is only by this method that that class of pseudo-architects who in our days intrude on the profession, to the discredit of art as well as artists, can be made to disappear from the scene.

We take the liberty to advise those civilised States, the schools of which make it possible to every student who has gone through the technical studies to choose the profession of an architect, even if he has absolutely no artistic aptitude for it, to discontinue this practice.

We wish particularly to point out that for architects there can be only one school—viz., an academy of the plastic art; an academy for this reason, that art cannot be taught, and consequently cannot be admitted as a scientific subject in any course of studies, and because artistic education only consists in this, that the master shows to the art pupil the right way to perfection, and encourages him by his own activity to enter on this path.

It is, therefore, absolutely wrong for technical high schools and schools for artistic trades to admit in their plan of studies the tuition of architecture, because, owing to the students not being tested as to their aptitude for the profession, an absolutely inferior standard of architecture is created.

From what has been said so far it follows that the architect is an artist with a scientific education.

By the studies of technical matters successfully gone through by the pupil, and with the academical apprenticeship, the requirements for the architect are not yet, however, exhausted. The student is still lacking practical activity, and the experience which results from it.

If the apprenticeship of the architect is an exceedingly long one, it will certainly be very considerably extended by the period he is acquiring practical knowledge in an architect's office.

In this section of the apprenticeship of an architect (his apprenticeship really ends only with his death), he stands once more at the parting of the ways in the progress of his education: that is to say, which way do his capacities lie? Circumstances, etc., lead him to the point either to accept the struggle for existence, or to enter into the safe haven of a salaried position. Here his artistic capacity plays the main part, because the greater it is, the more easily will he be able to refuse the enticing bonds of a fixed position, unless it be a professorship.

The curriculum of education of the architect so far sketched is the normal one, but we would remark at once at this stage that it is certainly not the only one, and that there will be sufficiently numerous cases in which the inborn capacities of the architect, in other words his talents, are so great that a lack of scientific education is hardly of any importance.

This fact, as well as that other, that there is no limit of talent either in more or in less—further, the fact, which it is impossible to dispute, that the first architects in the world—in a great many cases are not agreed on the question as to what constitutes an architect, give the certain proof that the title of Architect cannot be protected by letters patent, and that a judgment of artistic qualities is possible only by the artists themselves, consequently by the grouping of the artists among themselves.

In the latter circumstance we find also the proof that municipal and State administrations are not even in a position to make the proper choice of an artist to fill an office.

Still another important factor comes into consideration for making such a choice. The architect appointed to an office will, while occupying it, certainly not play the leading part. His individuality, his taste, etc., must therefore subordinate themselves to the same qualities in his superior, or even of more than one superior. The works carried out under the supervision of the office would therefore not show the capacities, the taste, and individuality of the creating artist, but certainly the less valuable ones of his superiors, and as such superiors in most cases are laymen in questions of art, and often even in technical matters, it will be hardly necessary to give any more reasons why from such a combination no good can come.

It must also be mentioned that the artistic gifts of an artist oppressed by the yoke of office can never undergo the absolutely necessary development. These considerations prove sufficiently that a municipal or a State administration is never in a position to obtain the services of first-class artists as salaried officials.

But municipal and State administrations have certainly the sacred duty of cultivating the fine arts, which means with regard to architecture that the buildings erected by them should exercise the effect of models. But buildings of such a description can only be expected from great artists, and not from officials of an inferior artistic capacity.

For the same reasons the competence of the officials must only extend to the practical, technical, and economical, but never to the artistic control of buildings in the course of construction. If, finally, it is taken into consideration that, by the awakening which took place in the region of art, a lively controversy raged everywhere, and that even to this day public opinion has hardly returned to calmness, and therefore is not in a position to judge with unbiassed artistic feeling works of art, such a large number of reasons has been put forward that the correct answer to Question I. becomes easy; it can only be this:

Important municipal and Government buildings can only be constructed by eminent artists, and not by salaried officials.

The considerations alleged up to now will facilitate considerably other questions before the Congress.

Mr. Oscar Simon, on behalf of the Central Society of



Architecture of Belgium, then added the following expression of his views:

The Central Society of Architecture of Belgium is of opinion that no advantage can result from the execution of public buildings by salaried officials (surveyors, etc.).

Neither for the administration, which protects its agent and takes upon itself the civil responsibility.

Nor for the public, which pays and suffers from the imperfect arrangements of the buildings destined for its use, and the aesthetic feelings of which are too frequently hurt and painfully impressed by the permanent sight of buildings generally devoid of artistic character.

While we shall avoid entering upon personalities or trying to prejudice private interests, and having only in view the preponderance of the architectural art, and for the only aim a better future standing of the architects as a professional body, considering that these have a domain of art and its interests to defend, we hold that it is an abuse that certain officials (surveyors) should offer to private parties on the look-out for authorisation by administrations services which are prohibited by the regulations and which are a form of unlawful competition highly prejudicial to the independent architects existing only on the income from their professional art.

It is desirable that more energetic action should be taken by architects, with a view to obtain legislative powers:

1. By bringing into harmony with the modern requirements of life the rate of the out-of-date tariffs still enforced upon the architects.

(A juridic consecration should be given to this principle: "To a superior talent higher fees should be allowed.")

2. By putting a stop to persons invading the architectural domain who do not exclusively exercise the profession of an architect.

3. By the revising of the laws on building in those passages where the text, or the interpretation given to it, imposes on the architect obligations and responsibilities inconsistent with his mission as an artist and out of proportion to the fees which are allowed for them.

(Apply juridically to the architect and to the contractor the common law principle: "To a larger profit must correspond a more extended responsibility.")

4. The Central Society of Architecture of Belgium, in the conviction that even within a modest range the co-operation of the architect will still result in the work being carried out under advantageous conditions as to price, duration, and arrangement, without excluding an artistic character which it is always necessary to strive after, is of opinion that if it be essential that the execution of public buildings should be entrusted to private architects it is ardently to be desired that all the work, whatever its importance may be, of construction and arrangement of plan of buildings for the public use should be exclusively given to practitioners of the architectural art.

In this there are considerations of corporative, economic, educational, and artistic interest, towards which the public officials must not remain indifferent.

To our corporation are due the normal consecration of public teaching of art, a professional encouragement, and an official recognition of the rights and prerogatives legitimately given to our profession.

Moved by a feeling of professional solidarity, the Seventh International Congress of Architects meeting in London in 1906,

Wishing to affirm with all its power the claims and just aspirations of the architects, with a view to an improvement of the economic conditions of their existence,

Formulates the Resolution:

That in the future the administrations of States, departments or provinces, municipalities or communes, as well as the administrations of benevolent institutions which may be founded by the former, shall give instructions for professional architects to be appointed by way of public or limited competitions, or whose special capacities or notoriety shall be universally recognised, for the projects of works or buildings to be carried out within their jurisdiction;

That an absolute prohibition shall put an end to the interference of agents paid by the public administrations, that they shall obtain through private persons an authorisation which can only be granted by public authorities;

That within the limits of their influence in the Legislative Assemblies our representatives shall take the initiative to bring about the reform of the laws in force in such cases where the obligations and responsibilities imposed on the architect are incompatible with his mission as an artist and in disproportion to the emoluments attached thereto.

[Other papers were read, which we will publish in our next issue.]

## A NEW ROUTE BETWEEN IRELAND AND ENGLAND.

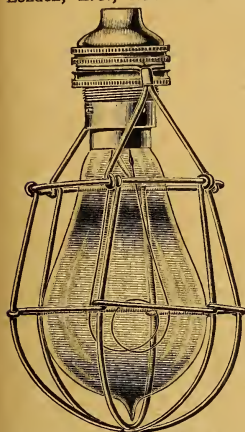
### Opening of Rosslare and Fishguard Railway Extension.

The new railway, which, in conjunction with the facilities afforded for shipping at Rosslare, will aid materially in opening up and developing the resources of the district, runs along the bank of the Suir from Waterford until it passes through Snow Hill tunnel, and crosses a bridge—2,131 feet in length—which spans the Barrow at the point where that river joins the Suir in its course to the sea. It then turns inland, and sweeps through the level country stretching from the bridge to the pier at Rosslare Harbour. The bridge is a notable structure, consisting of thirteen spans of 140 feet each, and one swing span electrically operated, and giving two openings of 80 feet each. The girders are carried on cylinders eight feet in diameter, widening out at the base to ten or eleven feet in diameter, according to depth of cylinder. The "rest" and swing piers are eight feet in diameter, widening out to twelve feet above low water, and the underside of the girders is twenty-five feet over high water ordinary spring tides. In some cases the bottom of the cylinders is one hundred and eight feet below mean water level. After crossing the Barrow the line is carried through a rock cutting about fifty feet deep, and 830 yards in length. It then passes close to Dunbrody Abbey, and runs eastwards for about twenty-five miles from the Barrow. At Killinck Junction it branches North and South, the Northern branch forming a junction with the existing Wexford and Rosslare line, and the Southern branch joining the Wexford and Rosslare line at Rosslare Junction Station, thus affording direct communication with Rosslare Harbour. At Waterford the existing railways approach the city on different sides of the Suir, there being no railway connection across the river, and part of the scheme undertaken by the Fishguard and Rosslare Railways and Harbours Company consists in making a junction between the line on the south side and the lines on the north side of the Suir. In order to effect this it was necessary to construct a bridge over 1,200 feet in length across the river, and to provide an opening for navigation. This bridge, which is now practically completed, consists of six spans of 140 feet each, one span of 102 feet 9 inches, one span of 133 feet, and an opening span of a bascule type on the Scheizer rolling system, giving 50 feet of a clear waterway. The underside of the girders is 17 feet above high water, and they rest on cylinders eight feet in diameter, broadening out at the base to 11 feet, and are carried down at various depths until they reach a solid foundation. The cylinders carrying the opening gear of the moving span are 10 feet in diameter, broadening out at the base to 12 feet, and finally to 15 feet. The contractors for the railway were Messrs. Robert M'Alpine and Son, and for the Barrow and Suir bridges Sir William Arrol and Company, of Glasgow, and they have complied with the terms of their contract most satisfactorily. In 1898 the Fishguard and Rosslare Railways and Harbours Company, a combination of the Great Western Railway Company of England and the Great Southern and Western Railway Co. of Ireland, obtained powers to construct a railway across the south of Co. Wexford from Waterford to Rosslare, with the subsequent intention of completing the harbours at Rosslare and Fishguard, thus obtaining shorter sea passage than that between Kings-town and Holyhead. In the construction of the pier and harbour the solid portion of the original pier has been retained, and has been extended in a north-westerly direction in two cantos, each about 500 feet long, thus giving an approximate length of about 1,500 feet quayside. The new portion of the pier is over 100 feet in width, and has been formed by an east and a west wall, with a connecting wall on the north.

A feature of the recent Printers' Exhibition at the Agricultural Hall was the type-setting and distributing machine, shown by Messrs. The Pulsometer Engineering Co., Ltd., the well-known pump makers. This machine has now been brought to perfection, and is described in a beautifully-produced booklet, which can be obtained on application to the Nine Elms Works, Reading.

## REVIEWS OF CATALOGUES.

The General Electric Co., Ltd., 71 Queen Victoria-street, London, E.C., forward us their monthly leaflet for June dealing with some of their latest specialities in electric fittings. These include a number of useful articles, one of which, the "Security" Lamp Guard, we illustrate, as it appears when fitted. Amongst the advantages of this Lamp Guard are that there is no cap or gallery to obstruct the light; the method of construction renders the guard unbreakable, and when it is securely fixed to the holder it is impossible for unauthorised persons to remove the lamp. Other fittings illustrated in the June leaflet include the following:—The "Flexo," Electric Light Table Standard, Section Insulating Fuse Box for use with



either conduit or lead-covered wires; Bracket and Pendant Boxes, Electric Bells, with cast-iron cases, for mining, engine-house and outdoor work; Cut-out Boards, Switches, Automatic Circuit Breakers, and "P.O." Telephone Sets for bridging work and long distance lines.

F. Wallis Stoddart, Western Counties Laboratory, Bristol, furnishes particulars of a new pattern of the Stoddart Continuous Sewage Filter. The original form of this filter was designed to satisfy the following essential requirements:—(1) Utilisation of the whole available fall, (2) instantaneous adaptability without adjustment to all rates of flow, however varied, (3) treatment of sewage and storm water on the same area, (4) total absence of moving parts. The filter can, if desired, be entirely enclosed so that the sewage is never in a position to diffuse odour, and it is a reliable means of conferring complete impubrescibility on tanked sewage, in situations where independence of supervision is a desideratum. Under a patent granted to Mr. Stoddart this year, entirely new patterns of this filter have been introduced. These are illustrated in the leaflet before us, and full particulars can be had on application to the inventor and patentee at the above address.

Messrs. Arthur L. Gibson and Co., 19, 20, and 21 Tower-street, Upper Saint Martin's Lane, London, W.C., furnish us with some interesting details of the Kinneair Pressed Radiators, which embody several new and ingenious features that appear to us to be worthy of mention. Radiators, as a rule, are made of cast iron, and as such are heavy besides being liable to certain defects, of which rusting and the possible existence of cracks and flaws are some. The feature of the Kinneair radiators is that they are made from the best grade of sheet iron, and freedom from flaws is thereby secured. All joints and connections are machine made, being formed from dies and machinery specially prepared for the purpose. The joints are locked and sealed together accurately and securely, so that it is impossible for them to part except under excessive pressure. They are also so made as to be unaffected by contraction or expansion. The idea of this construction is to secure a joint that is tight owing to its mechanical construction, but in addition each radiator, *after it is completely built*, is immersed in a molten metal composition which coats every part of the radiator, not only inside but also outside. Being applied after the construction of the radiator, the coating is never disturbed in any way, and it therefore forms an impervious surface, and further fills every seam or joint which may not have been tight prior to the immersion of the radiator. Each radiator is tested to a hydraulic pressure of 35 lbs. to the square inch. Contrasted with cast-iron radiators, the Kinneair pattern is claimed to possess the following advantage:—They weigh about 1½ lb. to the square foot, while the weight of cast-iron radiators

averages 7½ lbs. per square foot. The cubic content of the Kinneair radiator is 9½ gallons of water per 100 square feet of radiation, as against 18 2-3 gallons in cast-iron radiators. It follows that in the Kinneair system one-half the amount of water or steam is exposed to the same radiating surface. The net result is that the Kinneair Pressed Radiator is calculated to give the same radiation as the cast-iron type, while occupying only half the floor space and being only one-quarter the weight. Kinneair radiators are supplied, unless otherwise ordered, in zinc finish, but they can also be furnished in various electro-platings. Full particulars, price, etc., can be had from Messrs. Gibson, at the address as given above.

**Bradley's Improved (Self-acting) Dry-Earth System.**—The principle involved in the use of dry earth, as applied under the system for the purpose of deodorising, disinfecting, and disposing of excremental and other offensive substances, is that dry earth applied to such substances is known to achieve the desired result in the most simple and perfect manner. There is, in fact, much to be said for the dry-earth method, as contrasted with all others. For one thing, it does away with noxious gases, and the dangers arising from leaky drains; and, though for large communities it lacks the convenience of water portage, it is certainly to be preferred to privies, cesspools, and other systems which often involve contamination of wells and other risks. Another advantage is that the dangerous matter is not only rendered inodorous and innocuous, but it is also converted into a highly valuable manure, in such a form that it can be handled conveniently and even stored if necessary without danger. Bradley's earth closets apply the system in an extremely simple and easily-operated fashion. The operation is automatic and complete, so that when the user rises from his seat the required amount of dry earth is discharged from a container at the back on to the excreta. The only labour necessary is to keep the hopper filled and to remove the receptacle at intervals as required. These closets are self-contained, can be used within doors, such as in sick rooms, and are inexpensive. Full particulars, prices, etc., can be obtained from G. Bradley, 1 Connaught-villas, Wick-road, Hampton Wick, Middlesex, England.

## THE LABOURER'S COTTAGE.

In connection with the recent announcement in the House of Commons that the Government intend to provide the sum of 4½ millions for the provision of further cottage homes for the Irish labourers, and with the grand work that has already been done in this respect in Ireland, Professor James Long contributes an interesting article to the "Manchester Guardian" calling attention to the requirements of English labourers. According to the Professor (and he has lived among the farm labouring class for more than 30 years, and has visited their houses in health and sickness) the average village labourer's abode in England is a structure to which the word "home" should never be applied. It is badly constructed, badly ventilated, sunless and damp. The floors are of porous bricks worn with age, and reeking with the soakage of a generation of filthy surroundings; the ceilings are low and foul, and the walls, where covered at all, are plastered with layer after layer of dirty paper. Neither doors or windows fit, the bedrooms are cramped and grateless, and every detail up to the unsound and moss-bound roof bad and insanitary. Defective drainage has poisoned the ground, and often the water supply obtained from the well hard by. With this picture of a very large proportion of the cottages of England, one contemplates the rush to the towns without surprise, and understands why the men who remain on the land are driven to the village public-house. From his long experience Professor Long is convinced that in the majority of cases lives are more or less wasted, and lamentable characters formed owing to the environment in which the people are placed. He therefore urges on every ground—humanity, morality, thrift, health, education, and the diminution of pauperism, insanity and drunkenness—that the cottage home and an acre plot should be provided for the labourers of Great Britain as they have been secured in Ireland for the benefit of hundreds of thousands of its peasantry.



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of ceremony as demanded their attendance as hosts, the vast majority of congress men being American, foreign, or provincial architects. The truth seems to be that most of those who joined did so for the purpose of sight-seeing and amusement. The business meetings were as uniformly badly attended, as the trips and social gatherings were well attended. Of those who did attend the meetings and took part in the discussions, several betrayed but an elementary acquaintance with the subject matter of the discourse. Very notably was this so in the case of the discussion on reinforced concrete, several speakers appearing to have but very slight acquaintance with the subject, and to be wholly unaware of the enormous amount of research and experiment which has been made, and the quite voluminous and rich literature, the latter largely American, which the subject possesses. The discussion, from a practical point of view, had little or no value. A resolution was passed inviting inquiry into causes of failure.

The social side of such congresses, however, have a distinct value of their own in promoting friendly intercourse amongst men of the same calling. The mere visit to a foreign land, and inspection of its buildings, ancient and modern, howsoever cursorily, is educational. The great size of the gathering is, however, to some extent against it, and rather hinders much making of new acquaintanceships. To the native architect, on the other hand, it is not easy to see where the advantage comes, save that he is, in a sense, privileged to act the part of host to his foreign brethren.

Papers were read on the subject of Statutory Registration for Architects, one of the speakers being Mr. Robert Walker, of Cork, a veteran in the cause. After the discussion the following resolution was passed, only two voting against it:—

"That it is desirable, in the interests of the public of all nations, and of architecture, that all practitioners should have a statutory qualification."

The various trips were, as set forth in our report, most enjoyable, and were exceedingly well attended. Oxford, with its almost innumerable colleges, appeared to profoundly impress the foreign visitors, as well it might.

We have mentioned that criticisms of the arrangements might easily be made, but it would be ungracious to say too much on the subject, considering the amount of trouble that many gentlemen in London must have gone to, giving freely of their time; but there is no use disguising the fact that in very many details the arrangements were faulty in the extreme, and we cannot help thinking that the considerable sum of money subscribed might have been expended with more judgment than appears to have been the case. We refer particularly to the almost entire want of direction for strangers, who were frequently left to guide themselves without any aid as to assembly, conveyance, etc. For instance, a visit to Dorchester House was arranged on Wednesday. After a couple of days of frock coat and tall hat in tropical weather many visitors reverted to flannels and similar free-and-easy garb. There was not a word on the programme indicative of a formal reception at Dorchester House, and no guide or steward accompanied the visitors, who, to their complete surprise, were received by the American Ambassador and Mrs. Whitelaw Reid and entertained in the most hospitable fashion. Again, some of the charges were excessive. For instance, to charge visitors, particularly foreign guests, 3s. for a drive in a motor bus from Buckingham Palace to Westminster Abbey, or 4s. from Knightsbridge to Park Lane—both 1d. fares—admits of no explanation, and it must be remembered that every Member of Congress, whether lady or gentleman, had subscribed at least one guinea. The subscriptions appear to have gone wholly in printing, stationery, and rent of hall, as all trips

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## THE CONGRESS.

The great topic in the architectural mind during last week was the International Congress of Architects, held in London from 16th to 21st inst., inclusive. Elsewhere we publish a special description from our representative, who attended. We also publish abstracts of the principal papers read. On the whole, the Congress may be pronounced a success; doubtless there was much room for criticism, and the general arrangements made were far from perfect.

But, when all is said and done, the question naturally arises, of what practical utility, if any, are such gatherings, and why do people, even from distant parts of the world, attend them? At first sight one would be inclined to answer that a body of artists, or professional men (into whichever category architects prefer to put themselves) gather together for the purpose of hearing the undoubtedly valuable papers read by men, who are unquestionably experts, in an international sense, in the particular subjects they deal with, and that architects also wish to take part in or listen to the instructive discussions which are calculated to be stimulated. But that is not so. At some of the social gatherings, such as the reception by the President of the Royal Academy, there were 3,000 persons present, a goodly proportion of whom must have been architects, yet, never more than a mere handful of hearers attended to listen to the papers. Many freely expressed the sentiment, "that they would get all the papers in the ensuing week's professional journals"—not a very lofty view to take. The London architects of note were not very conspicuous by their presence, save upon such occasions

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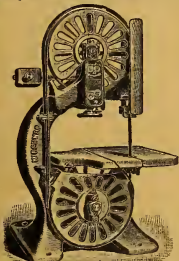
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were charged for, and that not at a reduced rate. As a whole, this was not creditable to the English metropolis, and was freely commented upon by those attending, and contrasted with former experiences in Continental cities.

The next Congress will be held in Vienna.

## COMMENTS.

### Mr. Bryce at the Society of Architects' Dinner.

The Society of Architects held their annual dinner in De Keyser's Royal Hotel, Victoria Embankment, London, during Congress week, and a very successful one it was. A brilliant and representative gathering, including many guests of distinction were numbered amongst the large company which sat down. The Society has for twenty-two years past fought the cause of Registration with unvarying tenacity, in face of every obstacle and discouragement, from within and without the profession, and there are not wanting signs that the goal is in sight, and possibly within measurable distance of being gained; and to-day it numbers upwards of 800 members scattered all over the British dominions, and is growing daily in strength and influence. Naturally enough, registration was one of the chief topics of the evening, and Lord Monkswell, an old and tried friend of the Society, in an admirable speech, made an eloquent statement of the case. The feature of the evening was, however, the brilliant speech of the Right Hon. James Bryce, the Chief Secretary, who displayed a wonderful and keen insight into the artistic side of the architect's calling, and of the principles which govern all good design. He showed his partiality for truth and simplicity, and dislike of pretension and sham. He noted, in passing, the fact that the Victorian era had produced no definite school of architecture. In the cities, he feared, too much had been left to chance, the whole aspect of the streets having been spoilt for reasons which could have been avoided if street building had been carried on under the management of a competent body. The Government and local authorities were now alive to the importance of the matter, and he trusted that there would grow up a twentieth-century style of architecture the merits of which would be appreciated by posterity. He said he believed that, great as the opportunities of the past fifty years had been for architects, the coming years would afford probably equal chances of distinction. He gave expression to views and sympathy, marked with intelligence that is rare amongst laymen, as to the more utilitarian aspect, and as to the grievances under which architects labour. But Mr. Bryce has done more. He has, since his speech, given proof that his sympathy for architects is not merely a cheap and useless commodity, but by his action during the Committee stage of the Irish Labourers' Act, is practical and sincere.

### The First Instalment of Registration

Following rapidly upon Mr. Bryce's speech at the Society of Architects' dinner last week, comes a most important, and somewhat unexpected piece of good news for architects, not merely for those directly and pecuniarily interested, but for the whole profession, as a healthy recognition of their existence and rights.

In the House of Commons, on Tuesday night, the Irish Labourers Bill, as amended by the Standing Committee, was considered.

Mr. Bryce moved a new clause providing that every person whom a district council proposed to employ as architect, engineer, surveyor, or clerk of works, for the purposes of the Labourers Acts should satisfy the Local Government Board that he has sufficient knowledge and experience for such employment. The clause, he said, was intended to enable the district councils to obtain better security for the competency of those they employed as architects, engineers, surveyors, and clerks of works. It was thought it would be an advantage to the district councils which had to put the Act into force, and enable them to save money. He did not, however, press the amendment very strongly in case those who represented the district councils did not attach importance to the matter. But he felt it his duty to lay it

before the House. He was anxious the House should not be detained from going on to questions of greater gravity.

Mr. J. Redmond said he did not like the clause, and could not conceive why it was proposed. Sooner, however, than occupy time he was willing to accept the clause, which was not of great importance. He recognised that unless the Bill passed through the report stage and third reading at the present sitting it would be impossible to get it through the House of Lords before the adjournment, which would be a great misfortune.

Mr. Sheehan said that personally he welcomed the clause.

Mr. T. L. Corbett heartily welcomed the clause on behalf of the labourers of Ireland, and hoped the Chief Secretary would stand by it. It might seem at first glance to add to the cost of building, but it gave a security for the quality of the work done that must be of advantage.

The clause was then added to the Bill.

This mode of justice may be described as the first instalment of registration, and, so far as we know, it is the first time that a clause dealing with the qualifications of either engineers or architects has appeared upon the Statute Book, save in the case of permanent officials. This particular clause is needed to remove a grave scandal, and it is a claim we have always strongly advocated. Now, practically speaking, it has become law. The Royal Institute of Architects circularised the Irish members on the subject, and last week two Dublin architects interviewed a number of members, but without receiving much encouragement. All received the suggestion sympathetically, but expressed the view which Mr. Redmond voiced, that it would be an inconsistent, a retrograde, and stultifying course for a member of the Irish party, which for years past has, in season and out, demanded popular control, to propose a measure conferring powers of veto upon a non-elective and irresponsible Government Board. We can appreciate this view, though to our mind it was carrying political principles too far.

Wisely, very wisely, Mr. Bryce refrained from pressing this clause upon the House, and so, small, insignificant little matter that it is, hardly worth discussing, it slipped through.

When the Act is placed upon the Statute Book, as there seems no doubt it will be, in its present form, it will confer upon the L.G.B. powers which they always complained were wanting to enable them to deal with cases of unqualified men, and if the power is wisely used, with care not to irritate local councils, but at the same time firmly and justly, it will do a good deal to curb unqualified competition in this country, and is a principle which, having once been established and recognised, may by persistent effort be largely extended. It is an instalment of justice for which all architects should be grateful to Mr. Bryce.

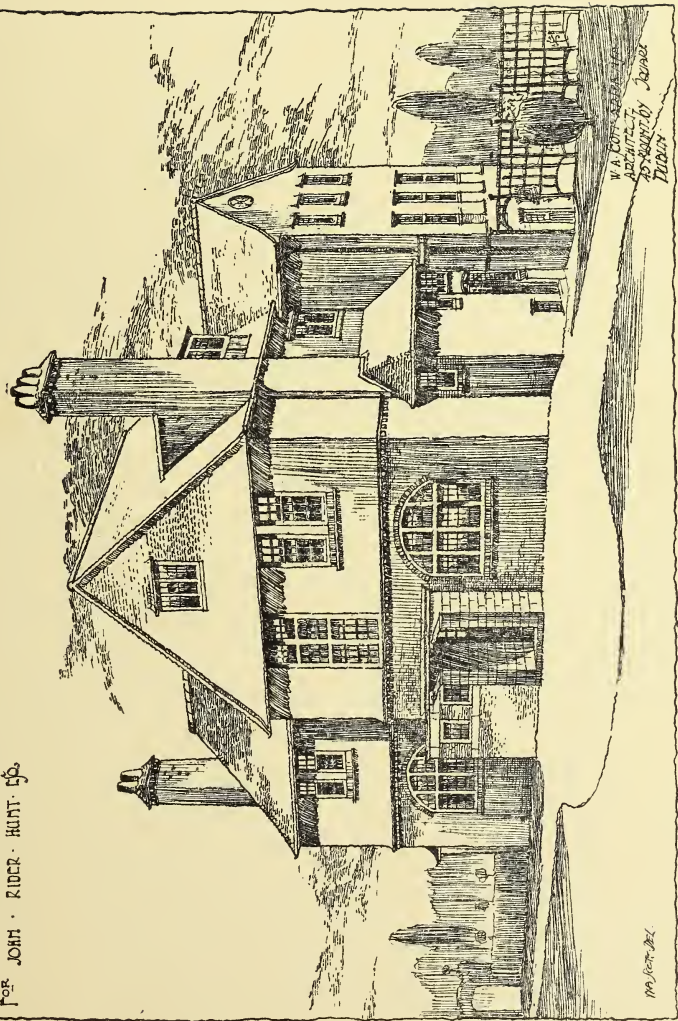
### The Ecole des Beaux-Arts and its Objects.

In a very readable paper before the Congress M. Robert Lesage, of Paris, gave a synopsis of the aims and objects of the world-renowned Ecole des Beaux-Arts, an explanation which explains much of its methods, otherwise seeming somewhat unsatisfactory.

L'Ecole des Beaux-Arts is not a school of architecture, but a *special school of the Fine Arts* in which the art of architecture occupies a place similar to those held by the arts of painting, of sculpture, and of engraving. The aim of the Ecole des Beaux-Arts is *to train the mind of the architect*, to put him towards art, and not to teach him a trade, or to prepare him for the *exercise of his profession*. It chooses its pupils by competition, and only admits men of superior intelligence and aptitude. The results which it has obtained force it to do this: it dominates all that is produced in architecture in France; it even makes its influence felt in other countries in the South of Europe, and especially in America. The technical instruction of the architect, the preparation of the practical architect for the part he is to act in society does not come within its province.

The examinations and competitions in mathematics and in construction which it imposes on its students from the very beginning of their studies of art have no other motive than to eliminate at once those who would be absolutely unfit for the study of the sciences of the building art, and consequently to become true masters of work. But the technical knowledge the pupils must go elsewhere to acquire,

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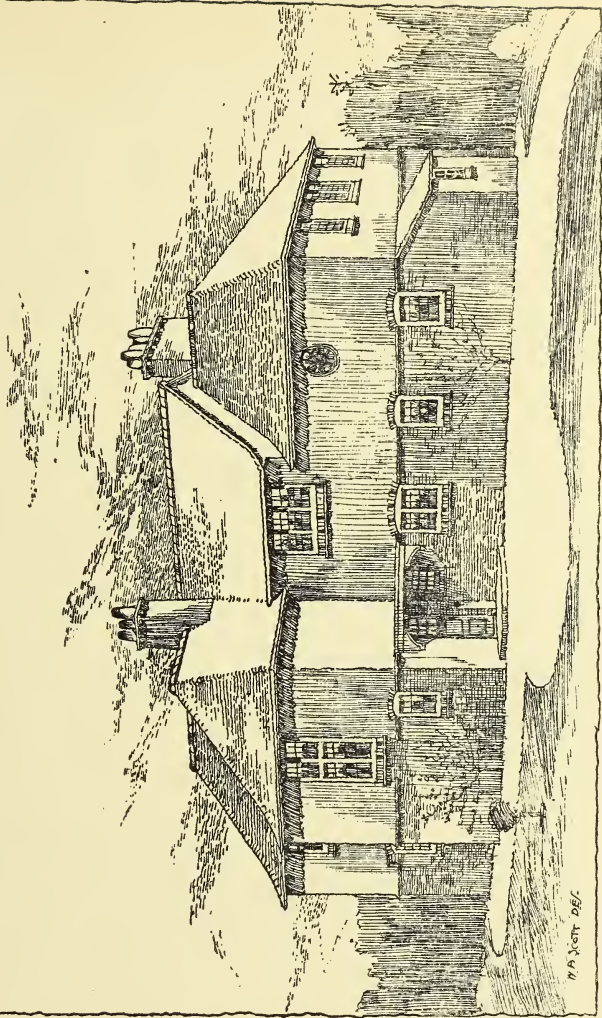




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and they must, above all, obtain it from experience in the building yards.

It is now beyond any doubt that this instruction left to the chance of experience should be given in a methodical manner, and give rise to a regular course of teaching; in this way our architects would undoubtedly be sooner and better prepared to defend the interests of which they are in charge.

This idea has been the cause of private undertakings which we have just mentioned; but in France the State has not yet done anything in this direction.

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July 11th, per Carrigan Head, from Montreal and Quebec, 78 pieces birch, 3,029 pieces deals, 126 logs, 36,540 pieces firwood sawn, to order; per Malin Head, from New Orleans, 2,151 pieces firwood sawn, to order; per Pandora, from Bangor, 185 tons slates, T. and C. Martin, Ltd.; per Mary Guldsworth, from Chester, 75 tons bricks, to order.

July 12th, City of Dresden, from Rotterdam, 4 cases Window glass, to order; per Danda, from Fredrickstad, 94,827 pieces flooring boards, 600 pieces slating battens, 10,458 pieces scantlings, 200 poles, Brooks, Thomas and Co., Ltd.

July 14th, per Stadt Schleswig, from Archangel, 38,415 pieces deals, battens, and ends, R. Martin and Co.; per Lady Martin, from London, 1,000 sacks cement, J. Kelly and Son.

July 16th, per Restless, from Antwerp, 290 tons slates, R. Martin and Co.; per C. S. Parnell, from Paisley, 120 tons fireclays, R. Brown; per Coniston, from Chester, 139 tons bricks, Brooks, Thomas and Co., Ltd.; 5 tons do., do., J. and C. Parkes.

July 19th, per Winga, from Goteborg, 13 cases glass, 1,340

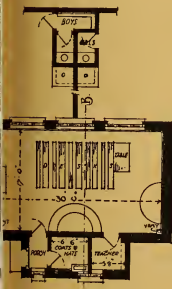
### A.A.I. CLASS OF DESIGN A NATIONAL SCHOOL HOUSE



END ELEVATION

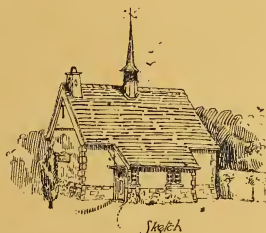


SECTION THROUGH OFFICES

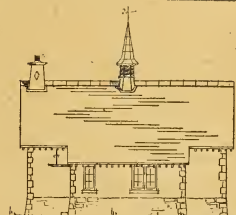


PLAN

10 20 30 40 50 FEET



Sketch



BACK ELEVATION



SECTION A-B

Design by CYRIL KIEFF, winner of Class Prize.

and roof trusses protected with porous terra-cotta at Milwaukee and Washington.

General interest in the necessity of fireproofing the iron constructive members in buildings was first elicited as a result of investigations of effect of fire on incombustible buildings in the Chicago conflagration of 1871.

The great building revival at Chicago in 1880 caused demand for fireproof structures to replace earlier buildings. High buildings were demanded and the main problem to be solved was how to build them fireproof and light enough to stand on elastic clay soil, which could only sustain 4,000 lb. to the foot. Solved by making flat floor arches very light. Foundation problem solved by first using iron rails in concrete with increased offsets. Invention of grille foundations followed. Structural steel I beams were first made in 1885, and steel for columns with complete steel skeleton construction perfected in 1888. All steel in these buildings was protected by tiles of various kinds. Several methods for building floors and roofs employed.—PETER B. WIGHT, F.A.I.A., Editor of the *Fireproof Magazine*, New York, at the Architectural Congress.

bundles boards, 20,784 pieces planed boards, 221 bundles mouldings, 170 pieces doors, 2,290 bundles laths, to order.

July 20th, per Glen Head, from Riga, 1,522 pieces firwood, sawn, to order; per Harrier, from Bangor, 185 tons slates, Dixon and Co.

July 23rd, per Marianne, from Archangel and Keret, 27,072 pieces deals, battens, boards, and ends, W. and L. Crowe, Ltd.; per Lewisport, from Miramichi, 47,283 pieces deals, battens, scantlings, and ends, W. and L. Crowe, Ltd.; per Henry, from Cowes, 160 tons cement, W. Chadwick; per Lady Roberts, from London, 600 sacks cement, A. R. Munday; 60 packages lead, T. Dockrell, Son and Co., Ltd.

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# THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.

The following circular letter has been addressed to the members:—

"DEAR SIR,—It has been found that owing to lack of funds the Institute has been much retarded in undertaking many useful professional movements, and it has been suggested that it has become necessary to increase the funds at our disposal by increasing the amount of the annual contributions of members. The question of income and outlay has been fully considered by the Professional Practice Committee, who have reported 'that the affairs of the Institute cannot continue to be effectively discharged with the funds arising from the annual contributions of Members and Fellows at present at the disposal of the Institute.'

"This Committee further report that 'it was not considered practicable to decrease the expenditure without drastic alterations of the Constitution and situation of the Institute.' With these statements before them, the members

## OUR ILLUSTRATIONS.

### Houses at Chipstead, Surrey.

The houses at Chipstead were erected in 1902 for J. Ryder Hunt, Esq., one of the big London surveyors. Although a man who has such an intimate knowledge of building and all its works and pomps, he was an ideal client, and did nothing without consulting his architect. The walls are built of Surrey brick, with a cavity  $4\frac{1}{2}$  inches from the outside, tied to the inner wall with iron cramps. The floors were all carried on iron corbels, so that the wall plates were not resting in the wall.

Portions of the walls are pebble-dashed, and the roof is covered with hand-made, sandy-faced tiles. The windows are glazed with leaded glazing, and the opening casements are of wrought iron. The mantelpieces in all rooms are of timber, with cupboards in most of them. They are not stock patterns, but were each designed for its special room. Mr. W. A.

## A.A.I. CLASS 'OF DESIGN'

### A "GATE LODGE"



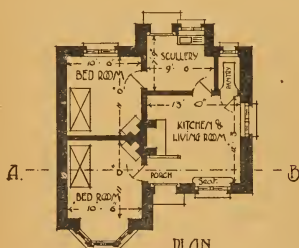
FRONT ELEVATION.



PLAN OF GROUND FLOOR.



SIDE ELEVATION.



PLAN.



BACK ELEVATION.



SECTION A-B.

10 20 30 40 50 60 70 80 90 100 FEET

Design by CYRIL KEEFE, winner of Class Prize.

at a general meeting, held on the 29th of May, 1906, adopted the following resolution:

"That a plebiscite be taken of members of this Institute as to whether the annual subscription be raised to 1½ guineas for members and 2½ guineas for fellows."

"I send you herewith our annual report for the year 1905, and would ask you to carefully read the report of the honorary treasurer contained in it. When you have done so, will you kindly reply at your earliest convenience, on the enclosed postcard, setting forth whether you are in favour of the proposed raising of subscriptions, or the reverse?"

"Yours faithfully,

"R. CAULFIELD ORPEN, Hon. Sec.

"13 South Frederick-street, Dublin, July 17th, 1906."

The Pulsometer Engineering Co., Ltd., Reading, have recently opened offices in Manchester at 206 Corn Exchange Buildings, Cathedral-street, with Mr. George Thompson as manager, and the agency with Messrs. F. B. Welch and Co. is therefore terminated.

Scott, A.R.I.B.A., M.S.A., M.R.I.A.I., 45 Mountjoy-square, Dublin, was the architect.

In the recent notice of the new Bridge-street Warehouse of the North-Eastern Railway at Newcastle-on-Tyne, we quite omitted to mention that the contractors were Messrs. J. Howe and Co., of West Hartlepool, who have carried out many contracts for structures in the Hennebique system.

As our readers are aware the Parnell estate at Rathdrum was purchased by the Department of Agriculture as a training ground for foresters. It is now being used for that purpose, and there are more than a dozen students, most of whom have been previously engaged in forest work or gardening. Special lectures are given them in one of the rooms of Avondale, principally in the evening or at odd times. During the remainder of the day they are engaged in cutting down timber, dressing it, or planting, according to the season of the year. Besides their training and instruction these men are paid 16s. per week during the first year, 18s. during the second, and 20s. during the third.

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Back View of Completed Grip.

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**Boola (Co. Waterford).**—The Trustees of the Catholic Parish Church of Knockanore invite tenders for the erection of a curate's residence, with out-offices, etc., at Boola, Co. Waterford, according to plans and specification, which can be seen at the offices of Messrs. G. Hodnett and Son, Solicitors, Youghal. Rev. Edmond English, C.C., Templemichael, Youghal.

**Cork.**—Tenders were received for the erection of a teacher's residence at Shanakiel, Cork, according to plans and specification prepared by Messrs. W. H. Hill and Son, Architects, 28 South Mall, Cork.

Tenders were received for the erection of a dwelling house at Magazine-road, Cork, for Mr. D. J. Callanan, in accordance with plans and specification of Mr. James F. McMullen, M.R.I.A.I., Architect, 30 South Mall, Cork.

**Co. Tyrone.**—Tenders were received for building a Parochial Hall at Dregish, Newtownstewart, Co. Tyrone, for the Parochial Committee, according to plans and specification of Mr. J. P. McGrath, architect, Commercial Buildings, Foyle-street, Londonderry.

**County Mayo.**—Tenders will be received for the construction of a concrete footpath in the town of Balla. Proposals will be received Wednesday, August 1st.

**Drumcondra.**—Tenders are invited for erecting a dwelling-house at Summer Hill, Drumcondra, for Mrs. Catherine Hickey. Plans and specifications to be seen at Summer Hill. Tenders to be delivered to James O'Connell, Esq., Engineer, Altmush Cottage, Kilmainhamwood, Nobber, to-day, 28th of July, 1906.

**Dublin.**—Smith and Pearson, Ltd., Newcomen Works, Dublin, have, in open competition, against English and Scotch makers, secured the contract from the Great Northern Railway Co. for the new motor carriage shed, 265 feet long and 36 feet wide, with steel framing and steel windows, to be erected in Belfast. The same firm are also erecting the new umbrella roof over the island platform at Amiens-street Station, for the joint occupation of the Great Southern and Dublin and Wicklow Railway Co. We are pleased to hear of this work coming to Dublin.

**Dundalk.**—Tenders are invited for the building of a house at Mounthill, for Mr. James Kirk. Tenders to be lodged before 28th inst. John F. McGahon, architect, Dundalk.

**Fermanagh.**—Tenders will be received up to Tuesday, the 31st July, by the Committee of County Fermanagh Farming Society, for the fitting up of show grounds in accordance with specifications to be seen at the office of the secretary.

**Manorcunningham.**—Tenders were received for making alterations to premises of Mr. Robert McKinley, Woodside, Manorcunningham.

**Kingstown.**—Estimates were received for the restoration of Nos. 105, 106, 107 Lower George's-street, Kingstown, for the Hibernian Bank, Limited. Messrs. William H. Byrne and Son, 20 Suffolk-street, Dublin, are the architects.

**Mountmellick.**—The Board of Guardians of the Mountmellick Union invite tenders for fitting up two rooms in a house in Village of Cloneygowan, to be used as a Dispensary. Tenders to be considered to-day, 28th inst.

**Portadown.**—Tenders are invited by the Urban District Council for the erection of a band stand in the Park according to plans and specification prepared by J. W. Walby, Esq., Architect. Tenders to be lodged on the 31st inst.

**Rathdrum.**—The Board of Guardians of Rathdrum Union will, on Monday, 6th August, receive tenders for building a doctor's residence and dispensary for the Anamoe Dispensary District, in accordance with the plan and specification prepared by the Guardians' Engineer and Architect, Mr. George T. Moore, C.E., No. 1 and 2 Foster Place, College Green, Dublin.

**SCARVA.**—The foundation stone of a new Orange Hall was recently laid. The plans for the new hall, which will cost about £1,000, have been prepared by Mr. S. W. Reside, architect. The building will be two storeys, and will contain, in addition to large hall and lodge-rooms, a library and reading-room.

**Waterford.**—THE WATERFORD NEW TECHNICAL SCHOOL.—The building of the new Central Technical Institute was commenced on the 26th of April, 1905. The area covered is 87 feet deep, with a frontage of 70 feet. The imposing stone front is of classic design, from plans submitted by Mr. J. J. Fleming, a local architect, and these plans were at once adopted by the local Technical Committee. The contract was entrusted to Mr. Patrick Costen, who recently completed the new Free Library in the most satisfactory manner. The situation of the new building is most central, and shows in bold relief its fine cut stone frontage. It is a commendable fact that in order to support local labour all this stone work has been dressed by local labour, by the employees of Mr. Costen. On the entrance there is a finely inscribed chiselled inscription in incised letters. The transept and entrance door is separated by two Portland-faced Ionic caps, and the building is surmounted by nicely finished cornices. There are on the front also string cornices and architraves around the windows. There is a beautiful railing five feet high in front. The principal departments are entered by a lower and upper corridor, 7 feet broad, 13 feet in height, and 64 feet in length. On entering the vestibule, which is neatly floored in black and white tiling, the walls to the height of three feet are done in cream tiling, with beautiful chocolate capping and skirting; under the side lights of the vestibule screen there are two bases of black polished Kilkenny marble. On the top panel of the entrance door, which is of plate glass, the inscription "Technical Institute" at once catches the eye of those entering the building. The porter's room is immediately on entering. A panelled and moulded arch leads through the lower corridor or ground floor. On the right, after leaving the vestibule, is the teachers' room, and opposite on the other side a class room for general purposes, 29 feet by 20 feet and 13 feet in height. Next it on the same side is the carpenter's shop, 30 feet by 20 by 13 feet high. Out of this the metal workshop is reached, and which is exactly of the same dimensions, fitted with the most modern appliances. On the right is a preparation room for the chemical laboratory, which is a spacious room, measuring 38 feet by 20 feet. To the rear of this are the male dressing rooms and lavatory. The committee room is a fine apartment, 20 feet square. An opened stringed stairway leads to the upper corridor. On the landing there is a fine semi-circular window, 13 feet by 6 feet. The corridor is lighted by a glass roof on Heywood's patent glazing system. The art room faces the front, and is 38 feet by 20, and is also lighted on Heywood's system. Divided by Wilk's patent partition from the art room is the drawingroom, 27 feet by 21 feet, fully equipped with picture and map rails. On the left is the clay modelling room, 20 feet by 16 feet. The cooking room is an exceptionally fine one, measuring 42 feet by 21 feet. Also on this side of the corridor are a pantry, scullery, and drying closet, all fitted in the most modern and approved style. On the right is the dressmaking room, its proportions being 40 feet by 21 feet. Adjoining this is a teachers' room 12 feet square. There are, of course, the necessary adjuncts of ladies' lavatories and dressing rooms, with store and stock rooms. The rear of the buildings are approached by an ornamental iron staircase, as a means of auxiliary entrance or exit. The building is heated on the low pressure system by a series of radiators distributed through the institution. This system is so arranged that all or any single room can be heated when required, and is one of the latest improvements in the heating of public institutions. Mr. Robert Costello, Waterford, is the contractor for the heating, and has also carried out the entire plumbing and sanitary arrangements under his personal supervision, a capable staff giving full satisfaction, the work done by him being of the most modern and approved description.—*Waterford News.*

**Youghal.**—At a meeting of the Youghal Urban Council it was decided that a Town Surveyor be appointed at a salary not to exceed £200 a year.

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# ENGINEERING SECTION.

## ITEMS.

Mr. Griffiths has been appointed by the Lord Lieutenant as advising engineer to the Government in connection with the marine works at Arklow and Wicklow Harbours. His duty will be to inspect them, on behalf of the Government, during their progress. It looks, therefore, as if the work in Arklow will be commenced without any further delay.

The statement read by Mr. Shanks at the recent luncheon, held in one of the partially-completed buildings, indicates that a very determined effort is to be made towards the success of the Irish International Exhibition. At present there is, perhaps, nothing very tangible to lay before the public, but the schemes are all-embracing, and if they arrive at fruition Dublin citizens will be in a position to congratulate themselves. It is sincerely to be hoped that, apart from the electrical installation, of which we gave a preliminary notice in last issue, there will be a considerable demand for space from home machinery manufacturers, particularly from those who specialise. A few good exhibits of gas, electric, and water-power plants on a small scale, would prove of incalculable benefit, and it is to be wished that engineering firms which cater for the requirements of municipal authorities will see that they are represented. We understand that the Alliance Gas Company will make a brave show, and that no expense will be spared to prove to the visitors the utility and economy of gas for domestic and power purposes.

Some interest has arisen in electrical engineering circles by the remarks of Sir William Preece, who, until lately, was Electrical Adviser to the Post Office, and is one of the leading authorities on the subject. At a meeting of the Carnarvon Harbour Trust, he strongly advised the trustees to light the Promenade with incandescent gas lamps instead of by electricity, on the ground that the former distribute the light more satisfactorily. He further stated that he always recommended public bodies to use gas in preference to electricity for lighting public thoroughfares. The weight of such eminent opinion has naturally caused a mild sensation amongst electrical engineers, who already find their battle with the gas companies increasingly difficult. In the early stages electricity, by reason of its novelty and the antiquated methods of the gas companies, swept all before it, but it is now in such general use that its disadvantages are more noticeable, and the wonderful improvements in burners and gas appliances, added to the favourable cost of gas as an illuminant, are causing a very serious reaction. It will be some time before Sir William Preece's opinions are permitted to be forgotten.

The recent motor omnibus accident at Handcross has turned public attention towards that form of conveyance, and statistics—more or less reliable—are appearing in the public press, showing how extremely dangerous motors are. In London, these omnibuses are found to be very convenient, economical, and speedy, and are proving serious rivals to the trams, tubes and suburban trains. They, however, prove to be very noisy when driven at excessive speed, and cause appreciable vibration in the houses along the route, and when over-lubricated a trail of unpleasant smelling fumes is left behind. In isolated instances, these nuisances were scarcely worth public notice, but now that the number of motor vehicles has so largely increased there is no doubt a speedy cure will have to be discovered and applied. Indeed, the question is of such importance that the Chief Commissioner of Police has issued a warning to the companies, in which he states that much latitude has been allowed in the past, it being deemed reasonable that the companies should be allowed necessary time for them to gain experience of the working of these vehicles. But complaints are now daily received that the maximum speed limit is

habitually exceeded; that drivers over-lubricate, regardless of the grave inconvenience to other users of the streets caused by the resulting noxious fumes, and that omnibuses, whose machinery needs overhauling, are permitted to ply on the streets instead of being sent into garage for the repairs they need. It, therefore, becomes necessary for him to exercise his powers of control over public carriages more stringently. There is no doubt that this warning will have due effect, and the motor services will thereafter increase in popularity, with the result that the present industry will be largely extended. The matter is one which is not of immediate interest, perhaps, to those who live in Irish cities, especially to Dublin citizens, for in the capital the tram service is so efficiently organised and worked that it serves practically all purposes. But motor bus services to the suburbs would be advantageous and would open up districts at present inaccessible, and it is quite possible that in time such services will be introduced. There is no doubt that motor vehicles have come to stay, and it is a matter for congratulation that public attention is being riveted on their defects. It is only by strong, popular criticism that improvements will be made, after which it may confidently be anticipated that the number of self-propelled vehicles will still more rapidly increase.

At a recent conference of Cleansing Superintendents held at Salford, Mr. F. W. Brookman, of Rochdale, described various methods of utilisation of city refuse. The clinker from a refuse destructor can be used for the making of concrete flags and asphalt pavements, bacteria and filter beds, concrete walls, bridges, foundations, and tram tracks, for bricks, sand for streets, plastering and mortar. Fish refuse makes valuable manure. In the larger cities and towns, large quantities of diseased meat are seized annually. If this be made into manure, the fat can be extracted and sold as grease, or made into soap. A source of trouble at destructors is the large quantity of old tins. In some places the difficulty has been partly met by the solder being melted from them and the scrap being buried in the tips. Elsewhere the scrap has been sent to the copper works, where the wet method of extraction is in operation, but it is not in much demand for this purpose at present. The scrap may be sent to chemical works, treated with acid, and made into green vitriol or copperas, which is used for sewage treatment in some places. If this salt be strongly heated, an impalpable red powder is deposited, called red oxide of iron. All old bottles and jars should be broken up to prevent subsequent re-use. If it cannot be sold to glass works conveniently, it should be possible for the municipal authority to have it melted in its own furnace.

The municipal authorities of Glasgow have, in a great measure, come to be looked on as very nearly perfect, and many communities envy the Glaswegians and their municipal Arcadia. But, a recent transaction has proved that in endeavouring to run a Corporation telephone system, the civic body "bit off more than it could chew." For some few years it has been apparent that the system was doomed to failure. The plant employed was of an obsolete and inferior type, and the rates struck especially to oust the National Telephone Co. were unremunerative. For a time accounts and statistics, backed by municipal enthusiasm, went to show that once again Glasgow led the van of progress, but the defects of the plant rapidly developed, working expenses and revenue parted company, and the gulf between them has yearly yawned wider; complaints as to the inefficiency of the service grew more numerous, and it became apparent that an absolute renewal of the system was essential. For the last three years the difficulties have been tided over in a fashion most provoking to the subscribers, who looked upon the service merely as a standby. At last the tension has been relieved by an offer—long hoped for—from the Government to buy out the whole concern for £305,000, a



fairly generous price, considering the nature of the plant, the unprofitable results from the venture, and that in seven years the licence would expire. So this novel form of enterprise has been abandoned, and the Glasgow Corporation has a severe failure to chronicle, a failure which will probably deter other bodies from dabbling in scientific schemes for which they are unfitted. At the same time some little credit is due. The National Telephone Co.'s monopoly was broken down, their charges were reduced, a more efficient service provided, and the number of telephone users greatly increased, nor was the concluding bargain derogatory to the pride of the "Canny Scot."

The new high level bridge over the River Tyne, at Newcastle, recently opened by the King, represents the largest bridge contract in these islands since the Forth Bridge. The new viaduct has been erected midway between the old high level and the Redheugh bridges, and will have four sets of metals, two for passenger and two for goods traffic. It consists of four spans of five lattice girders, the two centre spans being 300 feet, the northern span 231 feet, and the southern 191 feet, the total length of the bridge being 1,150 feet. The supporting piers are of granite with foundations 60 feet below high water level, built on caissons, and the sinking of these naturally proved the most delicate and arduous portion of the contract. They consisted of a chamber built of steel plates, open below, kept under such sufficient atmospheric pressure as to prevent ingress of the water. They rested primarily on wooden piles, and were gradually lowered by sawing away the supports, the cylinder of the caisson being added to above simultaneously, until the river bed was reached. The caisson was then closed in, with the exception of two airlocks, one for the use of the men and the other for the removal of excavated material. About thirty-five men excavated in each chamber, removing some 100 cubic yards of earth daily. When the desired depth was reached, the chambers were filled with concrete and the superstructure commenced. Material for the erection of the piers was conveyed from the banks by an overhead electric cableway, the largest ever yet used, the distance between the steel supports being 1,520 feet. By this transporter 30,000 tons of material were conveyed. The work was carried out by the Cleveland Bridge and Engineering Co., Ltd., of Darlington, and was designed by Mr. C. A. Harrison, chief engineer of the northern division of the North-Eastern Railway system. The cost considerably exceeds half a million sterling.

#### OAK PANELLING.

Oak panelling is a decorative feature of design, which, in this poor country, is invariably looked upon as so great and costly a luxury, as to be but seldom made use of. "Tudoresk," an oak panelling made entirely by machinery, offers a cheap and thoroughly effective substitute. It can be fixed, completed, and polished at a charge of only 1s. 6d. per square foot. It is not an imitation but a good, sound, artistic substitute for the hand-made work, admirably adapted for use in circumstances where the higher quality article would be prohibitive in price.

Owing to its being prepared entirely by machinery, "Tudoresk" can be provided at a cost but little in excess of other and more perishable forms of decoration.

It is a genuine and attractive panelling, made with solid oak framing, of good design and finish, in reproduction of old English forms, and will last indefinitely. Generally speaking, where adopted for existing rooms, a mantelpiece in keeping should be added, while in new work the cost of plastering, of skirting, and other mouldings, may be set against the added cost of the "Tudoresk."

The doors, too, may be reduced in thickness and faced with "Tudoresk" to match the walls, at a cost of from 35s. each.

Ceiling panelling, dado, chair rail, and cornice and frieze mouldings are manufactured to match.

The manufacturer and patentee is Mr. H. C. Cleaver, the Steam Joinery Works, 3 Eden-street, Hampstead-road, London, N.W., and from all house furnishers, builders, and decorators, from whom all particulars and illustrated catalogue may be obtained.

#### PRIVACY IN TELEPHONING. The Secrephone.

Amongst the inventions of the last quarter of the nineteenth century—a period singularly prolific in adapting the results of scientific research to our social and business necessities—the telephone undoubtedly takes high rank. It was in itself a sufficiently wonderful discovery, but though the wonder of it has been abated by long usage, its usefulness, far from being abated, becomes greater every day. When originally introduced, its sphere of action was restricted, so that it was employed merely for sending messages within the limits of a single community, such as a city, and it was employed almost solely by business firms. Recent improvements have, however, extended its scope almost indefinitely. It is now possible to telephone over long distances, such as, for example, between any two places in the United Kingdom of Great Britain and Ireland, or between Great Britain and most, if not all, of the cities of the Continent. In another respect also its field has been widened, inasmuch as now it is a familiar object in great numbers of private residences.

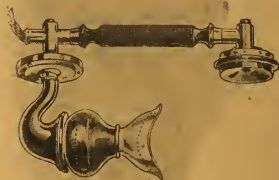
Notwithstanding all these advances, there is one drawback associated with the telephone as ordinarily used, and it is this, that in many cases, unless the speaker shouts at the top of his voice, the person at the other end of the wire cannot hear. In long-distance telephoning this defect, as might be expected, is particularly noticeable, and as a result it will be found that most habitual users of the telephone never speak into the instrument without considerably raising their voices. Very often this practice entails a good deal of inconvenience, because one does not always want his messages to be overheard by others in the same or adjoining rooms. Many subscribers have, of course, a telephone-box, which is at best a cumbersome, stifling, and expensive makeshift, ensuring, after all, only semi-privacy, for most of them are anything but sound-proof. Under these circumstances telephone users will welcome a small scientific instrument recently invented, called the "Secrephone," which can be attached by anyone in a few seconds to the trans-

mitter or mouth-piece of every kind of telephone. By its use telephonic communication can be carried on with the strictest privacy, messages conveyed in an undertone, or even whispered into the "Secrephone," being distinctly heard in the natural voice by the person spoken to. At the same time it is impossible for anyone in the same

office or room as the speaker to overhear the conversation. For trunk lines and long distance telephones this invention will prove very valuable, as the volume of sound is increased threefold, and the troubles caused by inductions and cross-circuits are largely overcome. The "Secrephone" is not clumsy, being only 3½ inches high. We give two illustrations, one showing its general appearance, and the other its application to a combination instrument. The price is 15s., and the address of the proprietors and patentees—The Secrephone Company, 10 Coleman-street, London, E.C.

The Smallpox Hospital, Carlisle, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

We are pleased to learn that Mr. A. J. Shingleton, 110 Kensington High-street, London, has received the contract for supplying blinds throughout the new War Office buildings in Whitehall, London. This is a very important contract, and may be taken as a tribute to the excellent manner in which Mr. Shingleton carries out work of this description.



## INSTITUTE OF SANITARY ENGINEERS.

The annual summer meeting of the Institute of Sanitary Engineers was held in Manchester on Friday, Saturday, and Sunday last, Sir William Mather, M.I.C.E., presiding. In his address of welcome, Sir William said the Institute of Sanitary Engineers represented a branch of the engineering profession, which, taking it all in all, was, he thought, the most beneficial of all the branches of the engineering profession. There were the civil engineer, the hydraulic engineer, the electrical engineer, the mechanical engineer, but the sanitary engineer seemed to differ from all these branches, inasmuch as he laboured in a field in which, more or less, all branches were interested, but which had to do almost solely and alone with the well-being of the people, in the highest sense of the word. To be occupied in projecting and carrying out schemes for the purpose of improving the health, the comfort, and the means of life in large communities was a noble work, entirely apart from the remuneration that it brought. In fact, one might say that the sanitary engineer had to work without many of those incentives and rewards which attached to other branches of the profession. He was occupied in dealing with elements in life which were not generally regarded as delightful to look upon or to contemplate; it was a branch of engineering which did not offer many attractions to those who desired to win praise from their fellow-men or to erect monuments to themselves by the work of their hands.

England, as they knew, enjoyed the reputation—or did enjoy the reputation some years ago—of being the most advanced nation in the world in sanitary science and in its application. He remembered some twenty years ago an eminent German scientist, Dr. Virchow, who came to England to report on the general tone of our institutions—educational, municipal, and otherwise—reported, on his return, that England was one hundred years behind Germany in education, but one hundred years ahead of Germany in sanitation. He thought that figure of speech represented very much the difference between Germany and England. He remembered Berlin when it was a city ugly and offensive in many respects, with no drainage system except that which was exposed to the street, with a vile atmosphere, bad water, and bad lighting. But, after twenty years, Berlin was now the pride of the German Empire. That great transformation had been brought about because education had advanced and performed its perfect work in relation to applied science to the advantage of the inhabitants of a great city. The sanitary engineer, the civil and mechanical engineer, and the chemist could provide several essential conditions of life, without which our boasted civilisation was all veneer and vanity. Every river and stream in the land might be pure, every town and city clear of smoke and noxious vapours, mills and manufactories wholesome and healthy, and the housing of the people, even the most humble, sanitary and cheerful, with fresh air and open spaces adorned with grass and shrubs, commons to all who inhabit the towns, together with good water and efficient drainage. All those science and experience—already possessed by those great professions—could accomplish. The architect, added to these men of science, would contribute the artistic feature to all necessary structures.

All this could be done in Lancashire. One proviso, however, must be made, which could not be fulfilled immediately, and without which the advantages of such changes would not be reaped. He meant that education of the right sort must be given to the children of the humblest classes, and to those above them in the social scale. That, also, was possible. We had already compulsory attendance at schools, and schools were universal. Only one thing was lacking, the right methods and right subjects of instruction for children to form their minds, to quicken their moral sense, to create right mental and bodily habits. He would rather see the children of our working classes acquiring perseverance, a moral conscience, good manners, clean habits, clean minds, manual training, the habit of thinking, elementary knowledge of the simple laws of health and nature, and physical strength, than the whole curriculum of the best elementary school we had. He was convinced that with children possessing the qualities of education he

had enumerated all things necessary would be added by self-education (hear, hear). That was the education which would leave the child to grow strong and true, to use its natural gifts in the best way during youth, and manhood, and womanhood. Then would the homes, once made sanitary, wholesome, cheerful, and pretty, become the delight and pride of the inmates. So must education and sanitation co-operate if our civilisation was to be something deeper than veneer and more thorough than vanity (applause).

Human communities were structures depending on their foundations, like other physical structures, being well laid and strong. It was a frequent complaint on the part of our municipalities, when they were charged with neglect of the housing problem, that the expenditure of public money in this direction was not encouraged because such a vast number of people did not appreciate better conditions of life; and the greatest impediment in this country to the better housing of the people was not the want of will on the part of the municipalities, nor the want of money—it was the difficulty of maintaining the habitations of the poorer classes in a fit condition for human comfort, owing to the habits and want of cleanliness of the people themselves. The first consideration in the advancement of civilisation was to raise the lowest and humblest classes, the broad foundation upon which human society was based, otherwise the superstructure would always be faulty (hear, hear). No efforts to provide what science and natural laws enjoined on us, what ideals inspired, or refined taste and the love of beauty would promote, could avail if the masses of the people did not co-operate by their appreciation, their care, and their proper pride to use and rightly enjoy cleanliness, health, and the appliances that provide them (applause).

Professor E. G. Coker, M.A., D.Sc. (President of the Institute), proposed a vote of thanks to Sir William Mather, which was seconded by Dr. J. B. Wilkinson, M.O.H. (Oldham), and carried with acclamation.

The following papers were then discussed:—

“The strength properties of brickwork as determined by experiment” by Mr. W. C. Poplewell, M.Sc.

“Refuse Destructors,” by Mr. F. W. Mason (Fellow).

“Sewage Purification Works, and the Health of the Community,” by Mr. J. Ashton, F.C.S. (Fellow).

“The Fire Requirements of the London County Council, with some notes on Fire Resisting Construction,” by Mr. Percival M. Fraser (Fellow).

“A note on Housing of the Working Classes,” by Mr. A. Alban H. Scott (Fellow), M.S.A. (medallist).

In the afternoon the members visited the works of Messrs. Mather and Platt, and were greatly interested in the many classes of engines and machinery in course of construction.

From the Salford Iron Works the party proceeded by special cars to the Salford Sewage Works, where they were received by the Mayor (Mr. Alderman Frankenburg). The engineer (Mr. J. Corbett) conducted the members and explained the treatment, which is by chemical precipitation and bacteria beds.

In the evening the members were the guests at dinner at the Midland Hotel of Sir William Mather, who presided. The company included, the Lord Mayor of Manchester (Mr. J. H. Thewlis), the Mayor of Salford (Mr. Alderman Frankenburg), the President of the Institute (Professor Coker), Professor Delepine, Principal Reynolds (Manchester School of Technology), Principal Knowlea (Salford Technological School), Dr. Niven (Medical Officer of Health), Dr. Carter Bell, Mr. Councillor Huddart, Dr. E. Hopkinson, Mr. A. Willett, Dr. A. Schwartz (School of Technology), Mr. F. Scott, Mr. Alderman Wilson, Dr. Skinner, Dr. Wilkinson (Oldham), Mr. G. W. Chilvers (Chairman of Council), Mr. N. W. Hoskins (Hon. Secretary), and others.

In responding to the toast of the Lord Mayor and Corporation of Manchester, and the Mayor and Corporation of Salford, Mr. Alderman Frankenburg (Mayor of Salford) said the death rate of Salford had been reduced from 27 to 17 per thousand—a saving of something like 2,300 lives per year. The death-rate of Salford was less than that of Brighton. The Corporation intended to make Salford a



health resort (laughter), and he asked their friends present from the South of England, instead of going to Brighton to come to Salford (hear, hear, and laughter).

The Lord Mayor of Manchester, who proposed "The Institute of Sanitary Engineers," spoke of the important work which the sanitary engineer performed in relation to the health and well-being of the community. The toast was responded to by Mr. G. W. Chilvers, who briefly stated the recent progress of the Institute in connection with its students' classes and examinations which tend to advance the status of the sanitary engineer.

Professor E. G. Coker proposed the health of Sir William Mather, who, in responding, expressed "amiable indignation" at this innovation in the programme, and wished the Institute every success.

The toast of the "Victoria University" was afterwards proposed by Professor Coker and responded to by Professor A. Sheridan Delepine. Mr. N. W. Hoskins proposed the "Manchester and Salford Institutes of Technology," and complimented Manchester on having such a well equipped school for the training of the sanitary engineer. The toast was responded to by Principal Reynolds, Manchester, and Principal Knowles, Salford.

Mr. T. B. Simmons (Vice-Chairman of Council) proposed the toast, "The Invited Guests, the Sanitary Committees, Engineers, and Medical Officers of Health for Manchester and Salford," and Dr. James Niven, Medical Officer of Health for Manchester, and Mr. Councillor Huddart, Chairman of the Salford Health Committee, responded.

On Saturday, the members were shown through the Manchester School of Technology by Mr. J. H. Reynolds, director of higher education. Later, they visited the University by invitation of the Vice-Chancellor, and Professor Delepine made arrangements for an inspection of the bacteriological laboratories. In the afternoon a journey to the Delamere Sanatorium was undertaken, under the guidance of Dr. J. B. Wilkinson.

On Sunday the members attended morning service at Manchester Cathedral, and in the afternoon they drove to Barton Bridge to inspect the aqueduct.

#### DUST PREVENTION ON HIGHWAYS.

In these days of fast motors the dust question has acquired an importance which the old-time makers of roads never anticipated. There are those who would suggest that the solution of the question is to be found in the prohibition of motoring, but this is a consummation hardly to be desired, even even if its attainment were feasible. The fact is that the motor car has come to stay, and as its presence on the road seems to involve considerable nuisance from dust it follows that a method of road treatment adapted to the new conditions of traffic is to be sought for. This appears to be the reasonable view of the case, and one that is in accordance with the history of progress in other departments. Where great inventions, such as the motor car is, are made, it invariably happens that instead of dispensing with them, because they do not quite fit in with existing conditions, these existing conditions are modified to suit them. It was so with the railway, with labour-saving machinery in every branch of industry. It will be so to the end of time. Applying this axiom to the dust question, we find that efforts are already being made to radically alter the treatment of road surfaces. It is evident that watered macadam has had its day, and that some substitute for the water, at least, must be found. Already several substances have been tried with varying degrees of success, most experiments having been made with various coal tar compounds. Amongst the latest materials to be tried is a calcium-chloride solution which has been repeatedly tested by the surveyor of the Northwich Urban District Council. This gentleman reports that the effect as a dust-layer is satisfactory. The liquor is cheap, and has the characteristic of absorbing the moisture from the atmosphere, and consequently the evaporation, which is a feature in the use of water, is eliminated, with the result that each night the road surface regains an amount of moisture, thus prolonging the effect of the treatment. Particulars as to price and instructions for using Calcium-Chloride for Dust-Laying may be had on application to Messrs. Brunner, Mond and Co., Limited, Northwich, Cheshire.

#### OUR SOUTHERN LETTER.

(FROM OUR CORRESPONDENT.)

##### Railways.

The Committee of the House of Lords, presided over by Lord Kintore, on considering the Cork City Railways and Works Bill, have decided to pass the Bill. There were only three petitioners against the Bill, and the Committee declined to insert any protective clause as to the obstruction of the traffic in the river at the bridges. They also declined to sanction any alteration of the rails, but inserted a vibration clause extending the period of two years, within which claims had to be usually made, to three years as regards two of the petitioners. Having approved of the remaining clauses, the Bill was reported for third reading.

##### Waterworks etc.

The Mallow Rural District Council have decided to carry out the scheme proposed by Mr. H. A. Cutler, M.I.C.E., for a water supply by gravitation to Buttevant, and that the area of charge for expenses to be incurred be fixed on Mallow Rural District. The estimated cost of the whole scheme amounts to £6,500. The supply is to be taken from Streamhill, and will include a supply to the military barracks. After some correspondence between the War Office and the Council as to the amount the former would contribute towards the cost of the scheme, they agreed to pay £220 for 30 years towards the repayment of the loan, after which the Council would have the military water rate and the domestic water rates, which would go towards the relief of the other rates, and, in addition, have a pure water supply.

The Bandon Rural District Council have decided to remove the old 2 inch and 2½ inch C.I. pipes in the existing water supply to Bandon, and replace them by using new 3 inch C.I. pipes, and are advertising for tenders for the execution of the work.

The residents of Rushbrooke have memorialised the Cork Rural District Council for a supply of water for the district, and the Council has ordered that plans of a water scheme be prepared and submitted for approval.

At the recent Public Health Congress, which was held in Cork, Major Jackson, R.A.M.C., medical officer in charge of the Cork Military Barracks, read a paper on "Water Analysis." After dealing shortly with the question of analysis, he launched into an attack on the present water supply of the city, and condemned the present supply as unwholesome and dangerous, and strongly recommended that a gravitation scheme of water supply for the city should be provided. This he did in face of the fact that he did not give any notice by the title of his paper that he intended to attack the Municipal authorities and their officials who were interested in the matter, and also several of whom had worked hard to make the congress a success. The City Analyst, however, pointed out that the water supply was now purer than ever it had been, and that everything that was possible was being done by the Corporation to reduce the chance of pollution, and also that the filter tunnel had been increased in length and efficiency. He also pointed out that the analyses made by Professors P. Frankland, F.R.S., and E. J. McWeeny, M.A., M.D., D.Ph., and made by himself (the City Analyst) completely nullified the statement made by Major Jackson. The paper led to a warm and animated discussion, so probably the reader was satisfied.

The Tralee Urban Council have decided to erect twelve artisans' dwellings in Rock-street, Tralee, and have accepted the tender sent in by Messrs. J. Reilly and Sons, contractors, Tralee, at a cost of £136 per house.

The Council have also decided to appoint a town surveyor at a salary not exceeding £200 a year.

We regret to announce the death, which occurred on the 10th inst., of Mr. Bradley Batsford, the senior partner of the firm of B. T. Batsford, publishers and booksellers, of 94 High Holborn, London. The business will be continued under the style of "B. T. Batsford" by Mr. Herbert Batsford, who will be assisted by his nephew, Mr. Harry Batsford, and Mr. Smith, the head of the staff, both of whom have been engaged in the business for many years past.

## LAW.

## Landlord and Tenant.

The case of *Lewes v. Baker*, commented upon in these columns June 3, 1905, has been carried to the Court of Appeal. A certain publichouse was let "from May 13 last until such tenancy shall be determined as hereinafter mentioned at the yearly rent of £70"—payable at quarterly intervals "in every year." The agreement provided that either party could determine his tenancy by giving the other party three calendar months' notice in writing. The question two Courts have had to decide is whether the premises were let on a yearly tenancy, in which case the notice could only be given three months before the end of the year, or whether it constituted a three-monthly tenancy. Having regard to other terms contained in the agreement, such, for instance, as that the tenant should repair, should pay taxes, and be subject to ejectment in case of misconduct, the Court construed this as a yearly agreement, but a study of the decided cases on this subject shows how fine the line has to be drawn, and we again urge lessors and lessees to avoid such litigation by a little care in expressing their intentions at the time when they enter into such agreements.—*The Builder*.

The following comment is made by our contemporary *The Builder* on a recent decision in reference to the vexed and important question of sewers and drains, and should be of great interest to all interested in the question:—In the annual report from the Chairman of the Highways, Sewers, and Public Works Committee of the Borough of St. Pancras some statistics are given showing that a large proportion of the work carried out by the Borough during the past year ending March 31 has been necessitated by combined drains which have been converted into sewers, and the report contains some observations on the state of the law governing this question. These remarks are on the whole well called for, since, as we have so often pointed out in these pages, the law is in a most unsatisfactory state. We, however, venture to think the report mistakes the law in one respect. The statement that a drain can be converted into a sewer even by a surreptitious connexion with the drainage of some other house is correct, but the report goes on to say that "thus contrary to a principle of English law a man is allowed to profit by his own wrong-doing." From a judgment of Mr. Justice Channell's, set out at p. 46 of Mr. Macmorran's book on "Sewers and Drains," it will be seen that the learned judge says he knows of no such case where an existing owner has been so allowed to benefit by his own wrong-doing; and a study of the cases will show that the surreptitious junction has always been erected by some former owner. What is required is certainty in the law and an abolition of its many complications and anomalies in connection with matters of every-day life.—*The Builder*.

## ARCHITECTS, CIVIL ENGINEERS, AND SURVEYORS' EXAMINATIONS.

Mr. George H. Fisher, private tutor and "coach," has just received the result of last June R.I.B.A. Exam. All students but one passed. This makes 95 per cent. successes during the last seven years. The "coaching" is done by correspondence (postal tuition), and personally at his residence in Derbyshire. Also, for the auctioneers, civil engineers, City and Guilds' Institutes; veterinary, medical, legal, pharmaceutical, etc., prelims. The passes for these last-named is too per cent.

Mr. Fisher makes an inclusive charge for tuition, lend of books necessary for the preparation, and has no printed work sheets. Each correspondent student has a separate w.s. prepared for, and sent to, him weekly, or bi-weekly as arranged, and those who place themselves under Mr. Fisher's care should benefit by more than twenty years' "coaching" experience for the abovenamed exams.

Resident students form part of the family, and whilst the mind is being exercised, care is taken that the body is not neglected—opportunity of tennis, croquet, bowls, bicycling, etc. Mr. Fisher's address is the Grange, Melbourne, Derbyshire.

## THE INTERNATIONAL EXHIBITION.

On Tuesday, 17th instant, the Marquis of Ormonde and the members of the Executive Council of the Exhibition received a very large company of representative Irishmen and distinguished foreign journalists, and showed them over the buildings, now well advanced towards completion. The visitors were well pleased with all they saw. The buildings have a very stately effect, and though, of course, of a purely temporary character, have much of the quality of stone structures. The general scheme is a central hall, with radiating wings, and various independent halls. There is no doubt but that, at the present rate of progress, the buildings will be fully completed in good time for the opening ceremony, some ten months hence. Needless to say, the pretty surroundings of "Pembroke Park," even encumbered as the site still is with the refuse and debris of buildings, add vastly to the general effect of the buildings, so that it can be imagined what a fine effect will be presented when the grounds are effectively laid out, with verdant lawns, gay flowers, sparkling fountains and well-kept walks.

Having viewed the buildings, the visitors were entertained to luncheon, the Marquis of Ormonde presiding. After luncheon, which was splendidly served by Mr. Mills, Merriem-row, Mr. James Shanks, the chief executive officer, read an official statement, in the course of which he gave some interesting particulars of the extent of the buildings, and particulars relating to the Exhibition generally. Mr. Shanks said that the buildings at the present stage, incomplete as they are, had been greatly admired, and there was general agreement that they would be worthy of Dublin, of the importance of the purpose which they are to serve, and a credit to the committee, the consulting architects, and the contractors. It may interest the company, he added, to know something of the size of these buildings. The floor area of the wing in which the luncheon was held was nearly 13,000 feet superficial. The area of the entire centre building, including the four wings, is almost 100,000 feet superficial, or nearly eight times the size of that Hall. The area of the machinery pavilion will be 90,000 feet superficial, or seven times the size of the luncheon hall. The concert hall and restaurant will each be about the size of this hall. The Fine Art Gallery will have an area of 30,000 feet superficial, and several other buildings ranging from 15,000 to 50,000 feet superficial in area have yet to be erected. The next most interesting question is the character and extent of the exhibits which these buildings will accommodate. Liberal arts and manufactures will be housed in the central building, with its four radial wings, in one of which the luncheon was given.

Generally speaking, Mr. Shanks declared that the exhibitors already arranged with included many prominent firms at home and abroad, there being a big demand for space.

A feature of the Exhibition will be the Fine Art Gallery, which will have a floor space of 30,000 square feet, and will comprise oil paintings, water-colours, and black and white work by British artists of the past fifty years, together with a display of sculpture.

The Engineering and Machinery section will be of a very extensive character, many well-known firms contributing exhibits. The Electrical section will also be representative. We may mention that Mr. George Marshall Harris, A.M.Inst., C.E.I., has been appointed Resident Electrical Engineer.

The whole of the buildings have been designed and erected by the contractors, Messrs. Humphreys, of London, Messrs. Kaye, Parry and Ross acting as consulting architects.

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## DRAINAGE.

Last week the Improvements Committee of the Dublin Corporation met to make the final arrangements for the opening of the great main drainage scheme for the city.

It is now fifteen years since the scheme—the cost of which, when the work for Clontarf and Kilmainham is completed, will be close on £600,000—was, at the instance of the late Alderman Meade, undertaken by the Corporation. The Special Drainage Committee, which was formed on the 4th of May, 1891, decided to proceed with what was then described as the Whitebank scheme.

Whitebank is situated some three-quarters of a mile east of the Pigeon House Fort, and for four years the scheme continued to be designated by that name, until, in 1895, the Corporation accepted the offer of the War Office, and purchased the Pigeon House Fort, upon which the title of the scheme was changed to the latter name.

The thirteen sections into which the scheme was divided—comprising intercepting sewers north and south of the Liffey, syphon under the river opposite Hawkins-street, main low level sewer from syphon to Ringsend, engines, pumps, and boilers, chemical mixing machinery, engine house and buildings at Ringsend, main high level sewer from Ringsend to the outfall, reclamation of site for precipitation tanks and outfall works, sludge pumping machinery and sludge vessel—are, for all practical purposes now completed. All the motive power required for the working of the plant at the Pigeon House is supplied from the Corporation electric lighting works close by.

The Committee are considering at the present time the recasting and renovating of the old buildings at the Pigeon House Fort to house the staff which will necessarily be maintained at the Pigeon House Outfall Works. The Committee have also under consideration the organisation of the staff needed to work the plant. It is estimated that about forty-five men, mostly mechanics and engine drivers, will be required for this work.—*The Independent*.

## ENGINEERING NEWS.

**Ballinasloe.**—DISTRICT ASYLUM, BALLINASLOE.—Tenders will be received from engineers for supplying and erecting five iron and steel roof frames for a span of 30 feet in the clear, according to plans and specification prepared by W. H. Kempster, Esq., C.E. Tenders to be delivered on Monday, 30th inst.

**Cork.**—The Cork Rural District Council will, on 2nd August, receive tenders for construction of waterworks at Knockraha.

**Foxrock (County Dublin).**—At a meeting of the District Council, the Clerk read the following applications for the appointment of engineer to supervise the carrying out of the Foxrock drainage scheme:—Messrs. M'Carthy, 39 Westmoreland-street, Dublin; Butler, Dublin; H. Clarke, Ballynahinch, county Down; Hind and Cheeke, Lower Merriem-street, Dublin; Birch, George Moore, Dublin and Pansing. Mr. M'Carthy was appointed, receiving six votes against four cast for Mr. Butler. None of the other candidates received any votes. The execution of the work has been entrusted to Mr. P. Dowd, Dublin.

The County Dublin County Council received tenders for the repairing of the South Pier of the Harbour, Lambay Island.

**Dundalk.**—CARLINGFORD WATER SUPPLY.—The Council of the district will, on 30th July, consider tenders for the erection of a reservoir, catchments, fountains and flushing tanks, and the laying of pipes, connections, etc., at the village of Carlingford.

**Fermanagh.**—The Proposals Committee of the above County Council, at their meeting on 27th July, received tenders to raise and fence the approaches to the canal bridge at Edergole, on the road from Newtownbutler to Cavan.

**Mallow.**—The Guardians of the Mallow Union will, on the 3rd August, receive tenders for the improvement of the sewerage of the workhouse.

**Newcastle (Co. Down).**—Newcastle (Co. Down), before being constituted an Urban District, was under the management of the Rural District Council of Killeke. Some years ago this Council had employed Mr. J. H. H. Swiney, M.Inst. C.E., of Belfast, to advise them on the sewerage of the town, and plans, estimates, and specification had been prepared by him, to a financial limit laid down by the Board. The matter then was in abeyance until the town was constituted an Urban District, several months ago, when the Urban Council took up the question, and again consulted Mr. Swiney. With an ardour worthy of a higher cause than the acquisition of filthy lucre, some engineers from England made unsolicited offers at preposterously low terms for doing the work, if only appointed, but the members of the Council are to be congratulated on the fact that they were not deceived by such specious offers, and finally, on the 2nd July, definitely appointed Messrs. Swiney and Crossdale, M.M.Inst. C.E., as their engineers to carry out a scheme of sewerage for the town.

**Tralee.**—The Urban Council advertise for a qualified engineer with experience of road making, at a salary not exceeding £200 a year.

## FIR TIMBER VERSUS PITCH PINE.

The "Timber Trades Journal" calls attention to a striking illustration of the fluctuations to which the timber market is subject as presented by the past and present trade of the old Prussian seaport of Danzig. As the older generations of builders will remember, these markets used to be supplied almost entirely with Balk timber from there and the neighbouring ports of Memel and Stettin. In later days pitch pine was introduced, and at a price with which the Prussian exporters could not or would not compete, with the result that the trade has gradually dwindled to very small proportions. Recent expansion in the United States has, however, reversed this position to a considerable extent, and pitch pine has been steadily rising in value, until the merchants in the East Country Ports think they have another opportunity. Danzig timber has, in fact, received a fillip, and English importers are looking to the Baltic provinces with a view of reintroducing red wood logs as a substitute for the more expensive pitch pine. The only thing that stands in the way is the disturbed state of the Baltic provinces. Were it not for this the present would be a more favourable opportunity than it is for resuscitating the fir square timber trade.

## TOWN OF TRALEE.

## APPOINTMENT OF TOWN SURVEYOR.

The Urban Council (Sanitary Authority) of Tralee invite Applications for position of Town Surveyor at a Salary not exceeding £200 a year. The Surveyor appointed must devote his whole time to the service of the Council (unless varied by special permission), and must attend in office for two hours each week day.

Age not to exceed 30 years.

A Candidate must be a properly qualified Town Surveyor or Civil Engineer or Architect, having at least three years' experience in a similar position, and of road-making.

The Appointment to be subject to the approval of the Local Government Board.

The Surveyor must perform all work to be prescribed by the Local Government Board under the Public Health Acts or the Local Government Acts; the Towns Improvements Acts and Acts incorporated with the above, and all further duties which shall be prescribed in the Agreement Regulating his Appointment.

Applicants must be competent to undertake the management of the Streets, High-Ways, Sewers, Water Mains, and Water Works, and all property of the Council. To take surveys and prepare accurate Maps, Plans and Sections, and to execute all the duties usually executed by Borough Surveyors. Applications must be in the handwriting of candidate, stating age, qualification and past experience, and accompanied by three recent Testimonials, and sent to my office, endorsed "Town Surveyor" on or before 31st July, 1906.

THOMAS A. CASEY,  
Town Clerk, Tralee.

July 16th, 1906.

## TIMBER, BUILDING, AND ALLIED TRADES.

—Young Man, having fourteen years' thorough knowledge of above in all its branches—Pricing, Estimating, Deducting Quantities, Adjusting of American and European Invoices, Freights, etc.; very rapid and sure at figures—desires engagement. Long experience of the requirements of the Dublin market. Apply, B 512, office "Irish Builder," Dublin.

ARCHITECTURAL DRAUGHTSMAN AND DESIGNER, fully qualified, quick and accurate worker, good planner, wants employment for whole or part time, or would do work at home. D728, this office.

YOUNG MAN, having 10 years' experience of the Building Trade, desires a situation as Builder's Clerk or Manager. Understands Plans and measuring same for quantities or work. Apply, "Northern."

# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,  
ARTS AND HANDICRAFTS.

Every Second Saturday.

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AUGUST 11, 1906.

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DUBLIN

Price 1d.

## TOPICAL TOUCHES.

Up to Saturday last, that is, within two days of the opening, the new City Hall at Belfast had been visited by over 26,000 people.

\* \* \* \* \*

The Corporation has decided to instal the various official departments in the new building on 1st September.

\* \* \* \* \*

The Lord Mayor and Corporation of Belfast have very courteously passed a special resolution permitting the IRISH BUILDER AND ENGINEER to reproduce a number of photographs specially taken for the Corporation; those we hope to reproduce in our next, in addition to those given in the present issue.

\* \* \* \* \*

We trust our readers will be pleased with our present issue, and with our effort to supply them with a well-illustrated and readable description of the new City Hall at Belfast. The occasion appeared to us to be so important as to demand some special treatment—to also publish a special description of the notable Congress of Master Builders in Dublin last month, together with several portraits.

\* \* \* \* \*

The Annual Congress of the National Federation of Building Trades' Employers, held this year in Dublin, was last week the chief topic of interest in building circles. The Congress was generally conceded to have been an unequalled success. By the way, the Chairman at the Banquet, Mr. Bolton, in his speech at the Banquet, reminded his hearers of a fact, not usually remembered, namely, the preponderating importance of the building trades—the building trade being, next to agriculture, the most important industry in these countries. Elsewhere we publish a detailed account of the week's doings.

\* \* \* \* \*

Belfast was en fete during last week; and a memorable week it was in the annals of the Northern City. The magnificent new Town Hall was opened by His Excellency the Lord Lieutenant amidst much popular rejoicing, and Belfast may well be proud of what is, indeed, a noble edifice. Take it all in all, the new Town Hall impressed us as one of the most satisfactory municipal buildings in the whole Kingdom. Standing wholly detached in an open space of five acres area, the Town Hall has a noble and impressive aspect, possessing four dignified façades, emphasised at the angles, and crowned in the centre by a great dome; it has attributes of design and surroundings such as few buildings in these countries can boast of. It marks the culminating point of the great enterprise of rebuilding and architectural adornment of the past twenty-five years, which already has changed the whole face of the city from one of markedly mean and provincial aspect to one which places Belfast high in the ranks of non-metropolitan cities in these countries. Elsewhere we publish a special description by our Belfast Correspondent, and a number of illustrations. In our next issue we hope to supplement the latter.

Last month there was placed in the Library of Trinity College a bust of the Right Rev. James O'Brien, D.D., Bishop of Ossory, 1842-74. The sculptor, we are glad to notice, is a Dublin lady, Miss Blanche Stack.

\* \* \* \* \*

The progress of the summer has not produced any material change in the condition of stagnation prevailing in the building trade in Dublin, and Ireland generally. In fact, it is still pretty safe to say, trade never was worse.

\* \* \* \* \*

There are in the United Kingdom 14,052 engineers and 13,044 architects, or a total of 27,096 in the allied professions, proof positive being afforded that they are jointly and severally more overstocked than perhaps any other calling in these countries, when we mention that there are only 27,184 lawyers, 73,909 schoolmasters, 27,592 doctors and surgeons, while there are but 10,973 journalists, and a mere trifle of 6,470 actors. These figures are not very encouraging to the youth who aspires the role of successful architect, mishelped on his way by the bland encouragements that "there is always room at the top!"

\* \* \* \* \*

Our readers who are architects will note, with satisfaction, that the clause empowering the L.G.B. to satisfy themselves of the competency of persons employed as architects, etc., under the new Act, which was introduced at the instance of the Chief Secretary, stands a part of the Bill, as it has now received the Royal assent. The administration of this clause in a fair and firm fashion by the L.G.B. should be productive of some good, although it comes rather late in the day, as many persons who should never have been recognised as architects have already secured vested rights as such and cannot be disturbed; but the L.G.B. can at least stop the further "miraculous manufacture" of architects from perfectly "raw material" by District Councils.

\* \* \* \* \*

The larger share of the credit for this substantial concession, of principle at least, should be given to the Royal Institute of Architects of Ireland, who, by prompt representation to the Chief Secretary, and to every Irish member, brought the matter into prominence when the Bill was under consideration. The Society of Architects in London also took the opportunity to press upon Mr. Bryce the claims of architects, and the Right Hon. gentleman is well acquainted with the merits of the registration question.

\* \* \* \* \*

Our Belfast Correspondent, in a letter addressed to us, and published in this issue, assigns the credit for the clause to the Belfast Architects' Society, and doubtless their representations were also well weighed by Mr. Bryce and contributed to the result; but the Irish members, who were lately interviewed by our representative in London, did not appear to be aware of them, and laid stress chiefly on the circular letter of the Institute.



## THE INTERNATIONAL CONGRESS OF ARCHITECTS, LONDON.

(CONCLUDED.)

## THE STATUTORY QUALIFICATION OF ARCHITECTS.

By MR. ROBERT WALKER (CORK).

In calling the attention of the Congress to Subject No. 5 on the programme, it will be convenient to say here that there is Parliamentary precedent to be found in the Statute Books of the House in which Registration Bills have passed into Acts with a view to conserving the interests of the professions and the public in their relations each to the other.

Without giving a long list of the professions so dealt with, it will be sufficient to name the cases of solicitors, barristers, physicians, and surgeons. The Medical Act is apposite to the requirements of the Architects' Education and Registration Bill.

The words "statutory qualification for architects" are consonant with the interests and well-being of the communities and peoples throughout His Majesty's vast jurisdiction, from the peasant in his cottage to the dwellers in royal palaces.

It will be seen, therefore, that this subject is in touch with the interests of the whole community, and is so far-reaching in its common interests that it extends to all the countries of the earth.

It is pre-eminently a subject of international interest, and is fittingly placed on the programme of this Congress.

The word "qualification" signifies that the architect (or the chief constructor) should be duly qualified to undertake those responsible duties by the acquisition of an irreducible minimum of general and expert knowledge and technical education and equipment, in accordance with a curriculum laid down by the General Council, when appointed by Parliament under the stipulations of a Bill which when it passes becomes law, making compulsory "Statutory Qualification for Architects" by placing the Bill on the Statute Book as the "Architects Education and Registration Act."

The necessity for such an Act appears to be conceded generally owing to the consideration that has been given to the subject during the past twenty years.

The members of recognised architectural bodies should be registered on their proving their membership, or on verified lists being sent to the Registrar by the Secretaries of those bodies.

The stumbling-block which has chiefly and ostensibly retarded the progress of such a measure for all those years, coupled with apathy, indifference, and jealousies, is precisely the same as that which blocked the Medical Act for thirty years, from 1828 to 1858, namely, that Parliament declined to pass a measure which made no provision for the vested interests of the unqualified men who assumed the functions of medical practitioners, and were accepted by the public in ignorance of their want of expert and technical equipment. It may be possible to come to some arrangement on this matter by way of compromise with the Select Parliamentary Committee.

A time limit of, say, five years may be agreed upon, during which practitioners could prove that they were in practice prior to the passing of the measure.

There appears to be no doubt but that the trend of opinion is in the direction of obtaining statutory qualification for architects, which will protect the members of the profession and the public, in the prescribed Parliamentary form of an Education and Registration Act having the short title "Architects Act."

The sooner such a measure is placed on the Statute Book the sooner will the evil complained of disappear. It will not impair the status and privileges, or invade the membership of existing architectural bodies.

The placing of the names of persons having what the Legislature denominates vested rights does not confer the right to membership in any of the existing bodies.

"Statutory qualifications" are qualifications enjoined and required by a curriculum, prepared by a competent authority, made compulsory by Statute, and tests applied

by competent examining bodies whose functions commence when the competent teaching bodies have completed their work; the results of the tests are then recorded and published in a book called the Register.

When the Bill reaches the Committee stage, memorialists in favour of it and petitioners against it would be heard at length, when clauses may be amended, struck out, or new clauses inserted by agreement. Should the Committee find that the preamble was proved, it would be sent back by them to the House; and if passed it would then become law and be placed on the Statute Book as the "Architects Act."

Want of qualification on the part of persons employed as architects may result in injury to life or health, discomfort, pecuniary loss, law-suits, embarrassments, and much loss and damage without a remedy.

Any means that can be devised even to tend towards guarding the public against the evils attendant on incompetency will be hailed with satisfaction by the profession and the public alike. Reforms should come from within, and it is clearly the duty of the profession to initiate and work out this movement.

This paper by an Irishman, Mr. Robert Walker, of which the foregoing is an abstract, was the best and most comprehensive on this subject read at the Congress. Mr. Walker, twenty years ago, drafted the first Registration Bill ever prepared, although the time has now come for a revision of its terms. Several other members contributed interesting thoughts to the discussion—for instance, Mr. J. S. Archibald, of Montreal—who said that the subject is a delicate one for the profession to discuss, as motives can be so misrepresented; but for want of advocates outside the profession all the necessary agitation must come from within. The charge has been made that it is only another species of "trades unionism," but on consideration it will be found that the principles underlying the formation of "trades unions" are wholly different from those which actuate us. The former is purely a movement to regulate the compensation and earning powers of the individual, whilst the latter is a movement to raise the standard of professional practice and to safeguard public interests.

We are, he added, hedged about by legislative enactments which at their root must have emanated from the conviction that the practice of architecture was a responsible one, calling for particular training and study. Architects are compelled to erect buildings under the direct superintendence and dictates of the law. The only inference to draw is that the practice of the profession is of such a nature that the individual cannot throw off all responsibility the moment the contract is complete. The logical sequence would also be that the law would make provision that all who enter into the practice of the profession would be found fully competent to carry out the spirit and dictates of such enactments.

It is obvious that such competence can only be established by a series of examinations. This is not always the most satisfactory method, but for want of a better we needs must adopt it. Such examinations must be all-embracing and wielded by powers beyond the faintest tinge of suspicion, and removed in the public eye from all question of self-interest.

Mr. Archibald added an important and interesting account of the history of Registration in the Province of Quebec, which Province has adopted the principle as a part of its Statute law.

The Province of Quebec Association of Architects is the pioneer (on the western side of the Atlantic at any rate) of statutory qualification for architects. This law was founded in 1898 as an amendment to the charter of incorporation. It was granted, as it was deemed expedient for the better protection of public interests and in order to enable the public to distinguish between qualified and un-

qualified architects and to insure a standard of efficiency in the persons practising the profession and for the advancement of the art of architecture. This law reads, "No person can take or make use of the name or title 'architect' unless he is recognised under this Act and as a member of the Association." The machinery is provided for the carrying out of a system of examinations and for the enforcing of the law.

M. Louis Bonnier, of Paris, on the other hand, pointed out what had been accomplished in France by the advocates of Registration; and, considering the fashion in which the State has in that country treated the movement, the results are marvellous. M. Bonnier is not a rabid Registrationist, but, like most sensible people, he has come to see that there is only one way out of the difficulty, which no one can deny really does exist. The Government in France has not instituted Statutory Registration, but a State recognition of a qualifying diploma has been extracted therefrom.

In architecture, which is at the same time the outcome of art and of science, more than in any other art, teaching is a necessity. Technical teaching, a deep study of the requirements, a reasoned knowledge of the materials, judicious application of the processes, and artistic teaching, grouping of masses, harmony of lines, taste in details.

These two teachings, which form a whole, can, it is clearly understood, be theoretical only. They cannot be separated without giving incomplete results—either draughtsmen or builders, but not architects. Not architects: that is to say, not artists, whose mind, formed of logical ideas and of decorative feelings, is ready to undertake any studies, any adaptations, any kind of progress, able to choose from among several solutions proper to satisfy the engineer, the best, that is to say, the most harmonious, the most beautiful. If the teaching is necessary for the transmission of the acquired results, it cannot be really efficient and useful unless it be accompanied by a sanction pointing out clearly the person to whom, amongst all others, may be entrusted with perfect safety the fortune of private persons and the budget of the State, the health of the individuals and the hygiene of the population, the preservation of the art treasures of a country, the improvement of the comfort of family and social life.

This sanction is the diploma.

The diploma, which is the consecration of long scholastic studies, preparing the architect for all eventualities, cannot and must not be obligatory in a free country; it is only an indication and, as it has been rightly called, a powerful presumption of artistic and professional capacity. It naturally corresponds with a want which, for a great number of years, has been puzzling the mind of architects, and which forms part of the programme of every congress. This want has received full and complete satisfaction in France. The facts are there to prove it—they are evident.

The campaign was started as far back as 1840.

Since that remote period the Central Society of French Architects took the initiative, and during more than twenty years, by means of controversies, reports and steps it fought the good fight until the day when, in 1863, M. Eugene Guillaume obtained from the Government the decree instituting the diploma.

After a period of modesty and obscurity, during which the first possessors of the diploma, without a bond, without influence, without protection, and treated as intruders, were the object of attacks as furious as they were stupid on the part of short-sighted architects, the architects with a diploma formed an association in 1877.

During a great number of years they struggled only to live, to hold on. Little by little their numbers increased. When they had become 200 the hostilities grew less; when they became 500, they were at last recognised.

There are to-day 750 distributed all over France, at the Institute, in all the great State administrations, in those of the provinces, and of the large towns. They constitute special groups in the Colonies and in foreign countries, in Switzerland, in the United States.

Freiherr Van Gobleschroy, of the Central Society of Architecture of Belgium, said, on behalf of that Society, that the great drawback the profession suffers from is due to the fact that the title of Architect may be assumed by

persons who have neither obtained a diploma nor received a special education, and that this unjustifiable tolerance places in the hands of inexperienced persons an art which they will never be able to understand, and still less to practise.

All who desire to make serious study of architecture should be made to acquire the large amount of indispensable knowledge necessary to enable them to carry out a project.

It will readily be admitted that this almost unanimous expression of international opinion affords some reason for insistence upon the principle of "Statutory Registration," and that those who uphold its tenets and advocate its legislation have the merit of justification on their side.

## STEEL AND REINFORCED CONCRETE CONSTRUCTION.

*Communication from the Joint Reinforced Concrete Committee.*

The great and increasing use of reinforced concrete in buildings and other structures, and the need of having some authoritative pronouncement on the proper conditions of its use, have led the Royal Institute of British Architects, with the co-operation of other bodies, to appoint a committee to enquire into the subject.

It has appeared desirable to the Royal Institute that some statement be made before the International Congress of Architects in London as to the general scope and aim of the committee, and the following outline is made with their approval:

The aim of the committee's deliberations is to prepare a report, stating their recommendations and conclusions as to:

1. What drawings and details should be prepared before work is commenced.
2. The nature of the materials which may be employed, and the standards to which these should comply, *i.e.*,
  - (a) The metal in reinforcement.
  - (b) The matrix.
  - (c) The sand.
  - (d) The gravel, stone, clinker, or other aggregate.
  - (e) Water.
3. What are the proportions for concrete to be used in different cases.
4. How the ingredients for concrete are to be mixed and deposited on the work.
5. The distances to be allowed between the reinforcing bars and what covering of concrete is necessary.
6. What precautions are necessary in the design and erection of centering and false work, and how long the whole or portions of centering and false work should remain in position.
7. The rules which should be used in determining the dimensions of the several parts necessary for security, and what safe stresses should be allowed.
8. The supervision necessary and the special matters to which it should be directed.
9. The fire-resisting properties of reinforced concrete.
10. Its adaptability for structures where resistance to liquid pressure is essential, and what special precautions may be advisable under these conditions.
11. What are the necessary conditions for its permanence; resistance to rusting of metal, disintegration of concrete or effects of vibration.
12. The testing of the materials employed and of the finished structures.
13. What provisions are desirable in Building Laws or Government regulations relating to buildings and other structures, so far as these affect the use of reinforced concrete.

The Committee having been recently constituted, and only two meetings having been held, no conclusions have been arrived at, and members of the Congress are invited to send communications, either the results of experiments or other information or suggestions that may be of use.

The following communication on "Ferro-Concrete Construction" was read by Professor Henry Adams, M.Inst.C.E.:—



So much has been written during the last four or five years upon the use of concrete and steel in combination that there is practically nothing new to be said. Those who have studied the literature of the subject will probably have been struck with the number of different terms used to express this mode of construction. "Béton armé," and the English equivalent, "armoured concrete," are perhaps the least appropriate. "Reinforced concrete" gives undue prominence to one element to the total exclusion of the other; "concrete-steel" is less open to objection, but the writer prefers the term "ferro-concrete" as being self-explanatory of the intimate combination between the two materials, the more important one coming first. A superficial criticism might allege that *ferrum* is iron, and therefore not applicable to steel, but steel is generically iron, and the term is therefore quite appropriate.

In early designs no provision whatever was made to resist the shearing stresses, which were either overlooked or ignored, and it is interesting to observe the gradual recognition these stresses obtained in the hands of the designers, until in recent construction they receive nearly as much consideration as what are called the "direct" stresses of tension and compression. The importance of considering shear was brought prominently under notice by the failure of experimental beams which had no special provision for meeting the shear stress towards the ends, where, of course, it is greatest. Various methods are employed in the different systems, but the Kahn trussed bar seems peculiarly suitable, the fin on either side of the core being left attached throughout the middle portion where the tension is greatest, and separated and bent upwards towards the ends to take the shear where the tension is least.

The question of adhesion between the concrete and the steel at one time caused some anxiety. It was naturally supposed that with increase of temperature the steel would expand more than the concrete, and it was thought that this would be sufficient to impair, if not to destroy, any adhesion that might be otherwise obtainable. As a matter of fact the linear change for a given variation of temperature is about 15 per cent. less for concrete than for steel, but when the actual figures are compared the difference is very trifling. Taking the range of temperature between summer and winter as seventy degrees Fahrenheit, the change of length in 100 feet produced by this variation of temperature will be for steel 0.546 inch and for concrete 0.454 inch, the difference between the two materials in a length of one foot being less than a thousandth of an inch.

With equal care in mixing the concrete the adhesion varies with the condition of the surface of the steel. When coated with red oxide paint it is extremely slight, and even a bituminous paint reduces the adhesion below that due to a clean unprepared surface. It is, however, found that the best adhesion occurs when the steel is rusted all over before being embedded in the concrete. This appears to be due to the formation of some chemical compound, or salt of iron and lime, which may not be detrimental in the absence of further moisture, but the final result is doubtful in such cases as reservoir walls, tanks, and dams. Painting the steel-work over with cement wash is a simple method of commencing the contact, and this would seem to prevent further rusting, on the principle of the pail of limewater into which the Sheffield grinders dip their small-goods to resist the tendency to rust when left wet.

Professor Bauschinger found the ultimate adhesion to be from 560 to 668 lb. per square inch, but Mr. J. S. Costigan found it not to exceed 65 lb. per square inch. Probably in the former case it was measured by the resistance of a rod to withdrawal, and in the latter by the insertion of small plates in a briquette. At any rate it is not safe to reckon upon more than 50 lb. per square inch as a working load for adhesion. Allowing 16,000 lb. per square inch as the working load on steel, the embedded length that would make the strength and adhesion equal would be 16,000 times the sectional area of steel in square inches divided by fifty times the surface area per inch in length, or briefly  $320 a \div s$ ; so that a quarter-inch square bar embedded for a length of twenty inches would be equally strong against tearing or slipping, and similarly a one-inch square bar would need to be embedded for a length of eighty inches. There are many different constructions in which this fact may be of

importance; for instance, in a simple beam, if the span is less than twice the above lengths, there will be a tendency for the rod to draw before the tensile strength is utilised, unless the ends are turned up to form cleats. In the edge of a circular ferro-concrete tank, instead of overlapping the ends of the rods, for which the above distance would be a minimum, it would clearly be more economical to turn up the ends and slip a welded link over them. There are several specially prepared bars giving greater resistance to withdrawal, e.g., the Ransome twisted bar, the square corrugated bar, and the Columbian bar, which relies for efficiency upon its large surface area compared with its sectional area, but plain rods which can be obtained everywhere should be adopted whenever possible, on the score of economy and avoidance of delay.

Ferro-concrete does not at first sight lend itself readily to architectural effect; the warehouses and coal stores constructed of it can hardly be called visions of beauty, but some of the recent arched bridges have a decidedly pleasing effect, and when the adaptability of the compound material becomes better known we may confidently look forward to the expression of taste as well as utility in the designs.

Perhaps the greatest departure from existing models occurs in the construction of ferro-concrete retaining walls. Hitherto we have looked upon weight as the essential element of such walls, and stability has been secured by leaning this weight against the bank of earth to be supported. We are now confronted with a new type in which added weight bears no part; the only weight employed is that of the earth itself. The construction consists of a skin of concrete reinforced with steel rods, securely and continuously attached to a similar base and forming with it two sides of a triangle. The face wall is then kept in position by rods protected by concrete, tying the inner edge of the base at intervals to the face at one or more points of the height. It does not follow that because the centre of effort of the thrust occurs at one-third of the height that that is the proper place for the connection to be made; it would be if the wall were disconnected at the bottom, but being firmly secured there the point of attachment should certainly be higher than one-third. If the stiffness throughout the height be uniform the point of attachment should be about 58 per cent. of the height. There are some other rather nice points of calculation about these walls which the writer does not propose to go into now; he would only point out that, apart from strength, the stability is obtained by the weight of earth resting on the base. Other examples of these walls have reinforced counterforts six to nine inches thick extending to the whole height at intervals of eight to ten feet, in the length, and others again have reinforced buttresses at similar intervals, and in one case the writer has seen the base of the wall extended in the front instead of at the back, so as to react by pressure at a considerable leverage, but this method does not appear to be so economical as that previously described.

There are, no doubt, many other uses to which ferro-concrete systems may be applied. Englishmen are naturally conservative; they like to feel that in their adoption of any new system they are not running too great a risk, and a novel form of construction such as this must undoubtedly have some failures, but, paraphrasing the old saying, the writer would urge that "nothing succeeds like failure." It is from failures that the greatest knowledge of true principles can be obtained, and therefore we should be grateful to those pioneers who do venture to take risk, even at the sacrifice of some reputation.

## REINFORCED CONCRETE AND ITS RELATION TO FIRE PROTECTION.

By E. P. GOODRICH, M.Am.Soc.E.

In choosing the subject of "Reinforced Concrete and its Relation to Fire Protection" the writer had in mind the dual conditions necessary to the greatest immunity from fire in large building constructions, particularly where such has varied types of occupancy, together with correspondingly different manufacturing fire hazards.

The requisites are, first, the employment of the most incombustible materials and the assembling of these elements

in such manner as will most effectively limit the spread of fire; secondly, the equipment of the building with such protective and extinguishing apparatus as a wide experience has determined most effective. Either of these essentials alone will accomplish a large measure of results, but to secure a maximum the combination is necessary.

An exemplification of such a combination is the tenant factory community being developed by the Bush Terminal Company of Brooklyn, N.Y., U.S.A., for which reinforced concrete has been adopted as the structural part of all buildings. These factories were especially designed to take advantage of all insurance regulations, and thus secure the minimum insurance rates on buildings and contents.

Associations of insurance companies in the United States have had the effect of standardising requirements. All the most important points thus developed were carefully considered in the design of the Bush Factories, which thus were provided with:

- Special fire walls.
- Special stair and elevator shafts.
- Waterproof floors.
- Automatic fire doors.
- A complete sprinkler equipment.
- Windows of wire glass in metal frames, etc.

The reinforced concrete design was prepared with special care to the fire-resisting qualities of the structure. A "unit" system of reinforcement was devised, which proved effective and economical, not liable to derangement during construction, and especially advantageous because allowing of the use of special fire-resisting materials at points of greatest danger. The columns, even though built of concrete, were fireproofed with cinder concrete shells, which served at the same time as a vehicle for the steel reinforcement and as a mould for the construction of the main body of the column.

The building now completed enjoys the lowest rate of fire insurance, both as to structure and contents, accorded any similar risk.

By Professor LOUIS CLOQUET.

(On behalf of the Central Society of Architecture of Belgium.)

#### *Constructive Point of View.*

The old style edifice was characterised by the separation between two distinct parts, the walls and the gable. There is a lack of solidarity between the two. At the point where the trusses of the frame rest upon the walls there is something like an articulation. The introduction of the metallic frames has not at once remedied this characteristic defect of buildings formed of stone walls and gables of wood. For a long time it was customary to combine trusses of iron similar to the wooden trusses. The solution of the problem of the large halls only made a decisive step in advance when the centred trusses were introduced, which have their starting point on the ground, like the trusses of the Dion pattern. From that moment the solidarity between the vertical and the inclined parts was secured. However, it is only the trusses which cannot be deformed. The solidarity between the vertical and the inclined parts is not realised in the enclosing surfaces. There is lack of homogeneity between the two parts of the building—that is to say, its skeleton or frame and its wall. Logic claims a more radical solution, which would consist in establishing solidarity not only between the uprights and the trusses, but rather between the wall and the roof. This is what the use of reinforced concrete enables us to realise. The side wall may even disappear or be made one with the vault. The whole will show almost uninterrupted surfaces on the outside as well as on the inside, with the absence of the encumbering internal protrusions of the frames. The new arrangement has, therefore, as a result, to save the trusses, and only to maintain a surrounding wall which supports itself without any assistance. Now experience has shown that buildings conceived on this plan do not cost more than those carried out in thick stone walls with metallic gables, and that they are solid.

If it is the question of a building with storeys the floor of reinforced concrete takes with advantage the place of the old systems. The most characteristic consequence of the

use of reinforced concrete is the suppression of the roof, as the uppermost ceiling can be used as a cover and constitute an inhabitable terrace. This kind of construction lends itself, moreover, to the boldest rakes or overhanging structures.

This system, if applied in a rational manner, is able to bring a change into the architectural forms. It simplifies the forms, it causes the cumbersome complexities of the frames and floorings to disappear, it simply carries out all the surrounding or separating surfaces. It makes disappear every distinction between the wall and the roof. It introduces an architecture consisting of so elastic surrounding walls that these can be given any dimensions required, according to the space it is useful to enclose. The habitations will take the shapes of parallelopipedes terminated by terraces, and the large buildings with curved vaults with visible estrades. We must be prepared to see sculptures and moulded relief work disappear and coloured ornaments to prevail. A radical change in the internal and external forms of the buildings will be the consequence of the substitution of a concrete solidary, homogeneous structure for our former architectonic organism. All the forms proper for a combination of marked out stones and covered over with plaster, which will henceforth no longer be used, would here be devoid of expression and aesthetic value. They must be given up and other methods must be found.

#### *The Aesthetic Point of View.*

We have in mind three kinds of form: those of *convenience*, those of *structure*, and those of *expression*.

The forms of convenience, by which the building receives its complete usefulness and a character in harmony with its destination, satisfies the mind without causing pleasure to the eye. Those forms of convenience which are, if not the most pleasing, at least the most excellent, can be carried out to perfection by making use of the processes, so eminently practical, of reinforced concrete.

The forms of expression are those by which the architect and his assistants put their imagination and their soul into the building, in order to impart to it the eloquence of a pleasant aspect. The ideal is that they shall form an integral and inseparable part of the structures. In the buildings constructed of reinforced concrete there is little scope for the artist's talent, especially the sculptor's. There remains hardly anything except the superficial decoration by painting and some polychromic, ceramic, or other adornments, but for the artists in colour a vast field is opened for their creations.

The forms of structure, either real or fictitious, are the principal ornament of the buildings produced by the old methods. They are those organic forms which give life to the aspect of buildings with walls of marked out stones.

In the old-fashioned conception a building is to be compared with a living organism where we can distinguish a skeleton, various members, and a sort of muscular system. Reinforced concrete does not afford these elements of interest and charm; it leaves the impression that the work has been carried out in too docile a material, on which the sacred labour of the workman and his traditional processes have not left the traces of the noble struggle between the artisan and matter. We do not find the same beauty in this work all cast in one block in a dead and dull-coloured material, without apparatus, without organism, with which the best thing that can be done is to hide them beneath a superficial decoration.

In conclusion the new processes, economic and powerful as they are, are precious from the point of view of certain bold and complex accomplishments. They are devoid of the charm of an artistic expression. Besides, economy is only a relative law and of a secondary character, and the boldness of the structure is not always required. A process which is prevalent from these two points of view does not impose itself to the exclusion of the others. Recourse may be had to it for the economic satisfaction of utilitarian projects, for the realisation of comfort, and for the solution of bold problems. But it will never eliminate from architectural practice the noble and artistic combinations of masonry work in marked-out stones, moulded and sculptured, of frameworks in wood and in metal, of superstructures with vaults, etc.



## STEEL AND REINFORCED CONCRETE CONSTRUCTION.

By JOAQUIN BASSEGODA (Barcelona).

Building in reinforced concrete does not solve any new problem either in art or construction; it is a composite building of stone and metallic materials by means of which, profiting by the qualities of the two components, difficulties are more economically solved than could be done with either of them alone.

Economy in the use of reinforced concrete does not depend on the low price of the materials of which it is composed, which are comparatively dear, but on their accurate combination, which allows of the quantity being reduced. Economy consequently has a limit in the maximum co-efficient of ironwork and concrete.

There is no reason why these co-efficients, especially that of the concrete, should be higher than in homogeneous constructions, for there are many circumstances, all difficult to foresee, which may produce lower resistances than those which have served as a basis in the calculation; such as the quality of the cement, the nature and size of the sand and gravel, and the manipulation and use of the different materials.

This consideration has produced various systems from which cement work has been almost completely eliminated, or in which, at all events, it has not been taken into consideration in the calculation; it is then considered as a simple exterior covering destined to protect the metal against agents which would tend to destroy it, such as oxidation and fire.

Security reaches its maximum in these systems, but, on the other hand, economy diminishes; it may happen that this kind of masonry may become less economical than other homogeneous kinds, such, for example, as brick laid with cement.

In countries where they have excellent brick which, according to an already old-established custom, they use in very reduced thicknesses, either in the parts which give support or in the parts which are supported (arches and horizontal floorings), one might introduce the system of fortifying these constructions, thus obtaining a greater economy in homogeneous masonry work and in fortified concrete work.

In places where construction in brick does not meet the conditions required, the use of fortified cement offers a real and effective economy over all other systems of construction.

### IVEAGH MARKET BUILDINGS, FRANCIS STREET.

This imposing block of buildings is the latest of Viscount Iveagh's generous gifts to the City of Dublin, and recently the markets were officially conveyed to the Corporation. Five years ago an Act of Parliament was passed by which street trading, as carried on in St. Patrick Street and the vicinity, was to be abolished, Lord Iveagh undertaking to provide suitable accommodation for the vendors within five years. The site formerly occupied by Sweetman's Brewery was procured, and subsequently some additional houses in Francis Street, in order to open up Dean Swift Square.

The buildings comprise a market for the sale of old clothes, about 100 feet wide by 150 feet long, containing shops and stalls, and a large floor space for hawkers, with a gallery 15 feet wide running all round the inside of the building. The shops and stalls are mostly divided by brick walls and fireproof partitions. The latter will materially assist the arrangement of the numerous fire hydrants and hoses distributed throughout the building, by confining to a limited area any outbreak of fire that may occur.

A second market for the sale of fish, fruit, and vegetables, etc., 130 feet by 80 feet, is similarly fitted up with shops and stalls. The fish stalls, of white glazed earthenware, are quite a feature and the first of the kind to be adopted, and the whole idea of the fittings and construction in both markets has been to facilitate cleansing. Both markets are self-contained, and are provided with the necessary offices—refreshment room, kitchen, with steam and gas cooking apparatus, and lavatories supplied with hot and cold water.

The principal entrance to the old clothes markets is from

Francis Street, and to the fish market from John Dillon Street. An entirely new road has been formed on the North-East side, leading from John Dillon Street to Lamb Alley, and it is hoped that ultimately this road will be continued right through to High Street. On the North side of the markets is an asphalted passage, 15 feet wide, dividing the markets from the disinfecting department and the public wash-houses.

The Act provides that all clothing shall be disinfected before being exposed for sale, and for this purpose three high pressure steam disinfectors have been fitted up, as also two formaline chambers for articles that will not stand the action of steam. This department comprises entrance yard, receiving room, disinfecting and disinfected rooms, distributing room, waiting room, stores, bath rooms, and dressing rooms for attendants, the whole covering an area of 6,000 square feet. The public wash-house, covering an area of about 3,500 square feet, is entered from the new road, and is fitted up with Bradford's latest and most approved laundry fittings and machinery. It provides accommodation for 40 workers, each compartment being self-contained, and fitted with steam boiler, washing trough and iron dolly, and with hot and cold water and steam supply. In addition there are four hydros or centrifugal wringing machines, and 40 hot air drying horses, and ironing and mangling room, and waiting room, with lavatory accommodation.

The motive power is steam from two 21 feet Cornish boilers and an 8 h.p. horizontal engine. All the machines are under-driven, thus obviating all risk of accident to the workers. A substantial and commodious dwelling-house is provided for the overseer of the markets, in Francis Street, and another in the new road for the chief engineer. The markets throughout are lighted by electricity, and the offices, etc., are all heated by means of steam radiators. The entire buildings are built of Portmarnock red brick, with stone dressings; the base, plinths, quoins, entrance steps, and landings are constructed of finely-tooled Newry granite, and the door and window dressings, strings, and cornices of Portland stone, and glazed bricks and tiles have been used as a dado internally. The design of the buildings is of the Georgian period, a style of architecture very prevalent in Dublin a hundred years ago, and in the present building we have one of the finest examples treated in a manner equal to the best models of that flourishing period. The stone arches of the entrances to the porch, and also the windows of ground floor of Francis Street elevation, are semi-circular, with elaborately carved keystones to each. The windows of the first floor are square headed, with moulded architraves wrought in Portland stone. This front is surmounted by a moulded and modillioned cornice and pediment, forming a fitting termination to what is undoubtedly one of the finest elevations in Dublin. The keystones of the windows are carved with heads representing the nations of the world. In the centre is Erin, and on either side Eastern Turkey, Europe, Asia, Africa, America, Spain, and an Israelite. Mr. Frederick G. Hicks, F.R.I.B.A., F.R.I.A.I., 86 Merriion Square, is the architect for the building. Messrs. McLaughlin and Harvey, Limited, Dartmouth Road, were the contractors for the works, which have been carried out in a most satisfactory manner. The whole of the wrought iron and steel work was executed by Messrs. J. and C. McGloughlin, Great Brunswick Street; the columns and cast iron work by Messrs. Tonge and Taggart, and the electric lighting by Messrs. Egan and Tatlow. Mr. J. Moore acted as clerk of works.

We wish to advise our readers that Mr. Tom White has removed his address from Stephen's Green to 132 Lower Baginbun-street, where communications should be addressed in future. Mr. White represents, amongst many other firms, Messrs. Bailey & Co., engineers, London, who are asbestos, vulcanizing, fibre, and leather merchants, and make specialities of engineers' stores of all kinds, and rubber goods for all steam users. Mr. White also represents the firm of Messrs. Fielding and Platt, whose engines are well known, and who are responsible for a suction gas plant which, we believe, has proved extremely reliable and satisfactory.

## THE BUILDING TRADES EMPLOYERS' CONFERENCE, DUBLIN, 1906.

The National Federation of the Building Trades Employers of Great Britain and Ireland held the annual conference last week in Dublin; and there is no gainsaying the fact that everything connected with the various meetings and functions was attended with the most unqualified success, with the solitary exception that the trip to Glendalough and the Seven Churches on Thursday was marred by bad weather.

Those of our readers not in the building trade may not quite understand what the "National Federation" exactly is, or what relationship exists between it and our Dublin



MR. GEORGE MacFARLANE.  
*President National Federation Building Trade Employers.*

Builders' Association and other local societies, so that perhaps it is as well we should explain at once that "The Federation," as its name implies, is a union of other or local societies, such as the Dublin Association, who are affiliated to the Central Organisation, forming a collective membership. Nowadays nearly every town in the Kingdom has its local society, not only of men, but of masters. Most of these are, like Dublin, affiliated to the Central Organisation, but certain others, such as Belfast, still remain outside.

### The Conference.

With this word of explanation we may go to say that the Congress opened on Wednesday morning with a conference in the Mansion House, a very large number of English and Scotch builders attending. The President of the Federation, Mr. George MacFarlane, of Manchester, presided. The members received a hearty welcome from the Lord Mayor, who expressed the hope that their deliberations would be the means of cementing that friendship which should exist between employers and employed, and that they would be able to devise some schemes whereby lamentable trade disputes and matters of that kind would be obviated in the future. As a workingman, he knew the difficulties and troubles that arose where a dispute took place between capital and labour, and, speaking as a workingman, he deplored such strikes and lock-outs. He was not there to say who were responsible for such disputes, but they all agreed that all suffered, and none more than the workmen themselves. He stood there as a trade representative, anxious for the amelioration of the class to which he belonged, anxious to see capital and labour working hand in hand, and he certainly would do all in his power at all times to smooth over any difficulties that unfortunately might occur. The President having replied, thanked his Lordship for his hospitality in placing the Mansion House at the disposal of the Conference.

### The Report.

The 57th half-yearly report, submitted to the meeting for adoption, stated that although trade during the half-year had continued depressed, there were some signs of improvement in the demand for builders' work. There had been very few disputes between employers and operatives during the past six months, and none in which the intervention of the Executive had been found necessary. Considerable progress had been made in raising the National Reserve Fund, and there was now on hands a sum of £1,658 16s. 9d., including interest, out of which a sum of £854 10s was to be paid.

On the motion of the President, seconded by Alderman Bowen (Birmingham), the report was adopted.

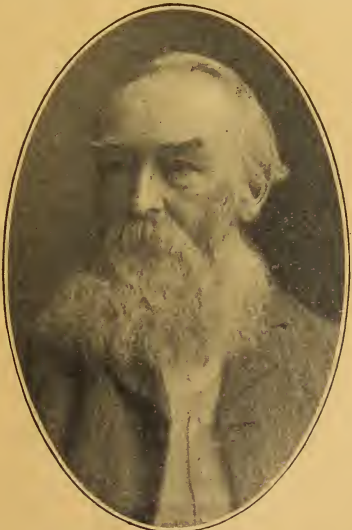
### Deputation from Belfast

Some further discussion having taken place, the next item on the programme was the reception of a delegation from the Belfast Master Builders' Association, which, as already explained, is still outside the Federation.

Mr. R. B. Henry, in reply, said they had experienced many difficulties in Belfast, amongst them being the question of the contract form, and they had watched with interest the successful manner in which the subject had been approached by the Federation across the water. The special form adopted by the Federation seemed to have become universal throughout Great Britain, with the exception of Ireland, and they as builders in Belfast had approached the architects in this matter, and were still working with a view to a satisfactory solution.

### The Conditions of Contract.

Mr. J. C. White, Solicitor to the Belfast Association, congratulated the builders and contractors of England upon having in conjunction with the Royal Institute of British Architects achieved a clear, well-defined, and equitable form of building contract. The form they understood was meeting with general acceptance, and already it had come to be recognised in the English courts of law as a standard document regulating the relationship between building owners, architects, and contractors. Decisions were forming on it, and if only uniformity was maintained there would grow round their conditions of contract a body of law that would be of common knowledge, and leave little or no room for disputes and litigation. In Ireland, however, the matter was still in a state of uncertainty. Until recently in Ireland no serious efforts were made to procure conditions of contract that would meet with universal sanction. Individual architects used various forms, each apparently doing what seemed right in his own eyes. This led to the confusion from which they in England had emerged. Within the past few years attempts had been made in Ireland to arrive at a common understanding, and it might be gratifying to them to learn that the contract which their Federation assisted in forming



MR. JAMES BECKETT,  
*President of the Dublin Master Builders' Association.*

had met with approval from many architects, and from most builders in Ireland. The Royal Institute of Architects in Ireland, having carefully considered and prepared five different sets of conditions of contract, a majority of their members reported in favour of the adoption of the Federation form, as the basis on which modified conditions of contract should be sanctioned, but the Council of the Irish Institute came to the conclusion that it would be wiser to



postpone the adoption of that form until some years of experience had proved their efficiency. The Belfast Builders' Association only differed from that view by stating that the form was sound and equitable, that it had already been under test for over three years, and that as the law regarding these contracts was the same in both countries the form of contract should be also the same. They further thought that there was no good reason for delaying its extension here. The Irish builders believed that the extension and general acceptance of that form of contract would be beneficial to all concerned, and earnestly desired that the Federation would assist in having it adopted. (Applause).

A number of delegates from several parts of England spoke of the successful manner in which the contract form has been brought into use in various districts.

Mr. Henry thanked the Federation for their information, and said, speaking for himself, he would certainly be in favour of joining it, but, of course, he would have to report to a meeting of his association.

#### The Value of the Federation.

Mr. Make (South Africa) also spoke on this question, and referred to the progress made there in respect of building generally and the conditions of contract under which builders operated in particular.

Mr. John Good, Hon. Sec. of the Dublin Master Builders' Association, said that the builders here had found the association of much assistance in times of trouble. They had recently a strike of considerable dimensions in Dublin in connection with one of the trades with which they were connected. It was a bitter fight, and they in Dublin came to the conclusion that they should import men to carry on their work. They sent to the Secretary of the Federation, and he put them in touch with the different centres on the other side, with the result that they got great assistance and thousands of men to enable them to carry their ends in the dispute.

Alderman Shepherd moved a vote of thanks to the Lord Mayor for having received them and according them the use of the Supper Room for their general meeting.

Alderman Jessop (Huddersfield) seconded the motion, which was carried.

At the close of the proceedings the party, which we reproduce, was taken by Messrs. Chancellor.

#### The Garden Party at the Zoo.

In the afternoon the members of the Congress and their lady friends were entertained at a garden party in the Zoo, given by the Dublin Association. The visitors were received by the following members of the Reception Committee:—Messrs. R. Denne Bolton, James Kiernan, H. McLaughlin, James Foley, and John Good, Hon. Secretary. Splendid weather favoured the function, and the strangers made their acquaintance with the world-renowned Phoenix Park and the scarcely less famous Dublin Zoo, under perfect climatic conditions. The gathering was a thoroughly enjoyable one, and about five o'clock the delightfully pretty grounds of the Gardens looked very brilliant indeed, the sylvan beauty of the place being enhanced by the bright costumes of the ladies. The attendance was very numerous, totalling over 1,000, of whom some 400 were visitors from England and Scotland. His Excellency the Lord Lieutenant was prevented from being present, as he had intended, owing to an older standing engagement to open the new City Hall at Belfast. Refreshments were served in a large marquee, and during the afternoon the fine band of the famous old "8th," the Royal Irish Fusiliers ("The Faugh-a-Ballaghs"), rendered a selection of music in capital style. Mr. Good and the Reception Committee are to be congratulated on the success of the party. A group of members and guests was taken by Messrs. Chancellor and Sons, official photographers to the Conference.

#### The Annual Banquet.

The great event of the Congress was, however, the annual banquet of the Federation, which was held on Wednesday evening in the new hall of the Gresham Hotel. The room presented a very bright spectacle when the large company sat down to dinner, and a distinguished and thoroughly representative gathering it was. Owing to the very regrettable absence of the President of the Dublin Association, Mr. James Beckett, through illness, the chair was taken by Mr. R. Denne Bolton, Vice-President.

Mr. R. Denne Bolton is a member of the Rathmines

Urban District Council. He is the senior surviving member of the old-established firm of Samuel Bolton and Sons, Contractors, Portobello Saw Mills, Dublin—one of the oldest and most respected firms of builders in the metropolis. The firm's business premises occupy what may be described as an historic site, being built upon part of the grounds of Portobello House, which, with its once extensive demesne, was presented to Henry Grattan, the great orator, by the Irish nation in recognition of his services to Ireland in connection with the constitution of 1782. The mansion, which still stands, though completely built round, behind the yard and offices of the firm, was the residence of the great statesman, and his descendants for several generations, and was, we believe, until a few years ago, used as his residence by the late Mr. Bolton.

The following was the menu of the dinner, which was served in excellent style:

*Hors D'Oeuvres*—Caviare on Toast.  
*Potages*—Clear Turtle. Puree of Chicken.  
*Poissons*—Boiled Salmon, Genevoise Sauce and Cucumber, Fried Smelts, Tartare Sauce.  
*Entrees*—Sweet Breads à la Toulousine. Patties à la Financière.  
*Relevés*—Sirloin of Beef, Horseshard Sauce, Roast Lamb, Mint Sauce, Haricots Verts.  
*Roiti*—Irish Dockings and Green Peas, Salad, Limerick Ham and Champagne Sauce.  
*Entremets*—Peaches, Meringues, Orange Jelly, Neapolitan Ices.  
*Dessert*—Pine Apples, Grapes, Bananas, etc.  
 Coffee Liqueurs.  
*Wines*—  
 Sherry, Old Dry Pale.  
 Hook, Niesteiner.  
 Champagne—Perrier Jouet, 1898 Vintage.  
 Claret—Chateau Margaux.  
 Old Tawny Port.  
 Old Irish Whiskey and Minerals.  
 Liqueurs—Cognac, Curacao, Chartreuse, Benedictine, etc.

#### On the Chairman's right were:—

The President National Federation of Building Trades Employers of Great Britain and Ireland (G. MacFarlane, Manchester); Right Hon. Recorder of Dublin; Senior Vice-President N.F. (W. Nicholson); President King and Queen's College of Physicians (Sir Wm. Smyth); Vice-President N.F. (Almauld Bowen, J.P.); President Dublin Chamber of Commerce (M. Goodbody); Vice-President N.F. (G. H. Barnsley); James Kiernan; President Institute Builders, London (J. L. Dove); President Royal Hibernian Academy (Sir Thomas Drew); Vice-President N.F. (Alderman Jessop, J.P.); Sir Maurice Dockrell; President Liverpool N.F. (R. Bullen); President South Wales N.F. (W. A. Linton).

#### On his left:—

The Right Hon. the Lord Mayor; Under Secretary for Ireland (Sir Anthony McDonnell); Right Hon. Sir Horace Plunkett; Vice-President N.F. (W. Shepherd); President Royal Institute of Architects (W. M. Mitchell); Past President N.F. (Joseph Bell, J.P.); H. McLaughlin; President Scottish Builders' Association (Mr. Knox); Sir Charles Cameron, C.B.; Vice-President N.F. (W. Sarsfield); The Borough Surveyor and City Engineer of Dublin (Spencer Hart, M.I.C.E.); Chairman Kingstown U.D. Council (R. N. Potterton); President Yorkshire N.F. (Paul Rhodes); Ex-Chairman Kingstown U.D. Council (W. G. Barrett).

#### There were also present:

Messrs. John Good, Hon. Sec. Master Builders' Dublin; M. Good, L.L.B.; F. W. Cowlin, J. Navagh, H. Martin, C. Jolley, P. Shortall, B. Millard, G. Goodfellow, J. Pemberton, W. Partridge, Wm. Beckett, Jos. Pemberton, J. Thompson, W. Collen, R. Farquharson, P. Conway (Daily Independent), the representatives Daily Express, Irish Times, Freeman's Journal, and Master Builders' Journal; the Editor, IRISH BUILDER, J. Weldon, C. Kelly, G. Hewson, T. H. Levingston, A. Agnew, Thos. Mackey, R. L. Warren, R. E. Mellon, G. Dalton, J. E. Foley, G. Whiteacre, G. Crampin, Thomas Connolly, the President Dublin Trades' Council, E. R. Warren, B. W. Whyte, K. Toole, P. Caulfield, F. W. Amphlett, Birmingham; J. F. Armstrong, R. Allen, — Ambrose, Bath; J. Biggan, Councillor J. Bromage, High Sheriff of the City and County of Worcester; B. Bennett, Councillor Blackburn, F. Brown, John Bagnall, Percy Bray, R. H. Bards, Arthur Chambers, J. Carmichael, A. W. Chamberlain, Robt. Chambers, Henry Cave, J. D. Cooke, W. H. Cooper, W. Cooke, junr., D. S. Cross, A. H. Constance, Councillor J. Dawson, James Devries, Joseph Dickinson, J. L. Drake, J. H. Dawson, Griff. Davis, — Davis, S. Eastern, E. A. Elvey, F. Elrington, A. H. Edmondson, T. Eshelby, J. E. Foley, R. Farquharson, A. J. Forsdyke, Henry Fallas, Arthur Frost, F. Gregory, James Hamilton, F. Higgs, R. Hyslop, J. Hallett, W. H. Hildroyd, A. Hammond, R. B. Henry, W. H. Hope, — Hodges, Alfred Haworth, — Hall, Bury; Wm. Johnson, R. Johnson, T. James, C. Kerridge, J. Kearn, W. P. Lewis, W. P. Ledgard, Jas. Longdon, Thos. Lonsdale, Councillor J. Mansfield, W. Marshall, H. Mathews, J.P.; J. S. Myers, J. W. Mallinson, James Merritt, Chas. Moxon, A. S. Morgan, A. Masters, B. Moss, W. Macdonald, J. A. McCauley, John McFarlane, J. McCann, E. J. Neale, G. E. Powell, H. J. Probert, Sydney Rieby, L. Radcliffe, T. Rothwell, T. Roper, A. W. Sinclair, S. Smeithurst, J.P.; J. Stons, Alderman Skinner, A. Seaton, John Smith, W. R. Sterling, J. H. Tomlinson, J. E. Taylor, Jas. E. Turner, Chas. Tomkinson, F. Wilkinson, J. W. White, F. G. Whittall, W. Winstance, Jas. Wright, J. B. Whitehouse, W. F. Wallis, E. W. Wooster, E. Walters, C. Wheatvill, Richard Weston, B. W. Wilkes, W. P. Weir, Thos. Weatheritt, T. Watkins, D. Williams, J. Walkin, — Whitlock, Birmingham; J. H. Walker.

The usual loyal toasts having been honoured, the Chairman, in proposing the toast of the evening, "The National Federation," dwelt upon the great numerical importance of the trade, which, it might, he said, surprise some people to learn occupied the next position to the agricultural industry of the country. The wages paid last year represented close on thirteen millions, while even in Ireland, with its great breweries and distilleries, not one of these great industries were in it with their trade.

Mr. G. MacFarlane, President of the National Federation, responded. The Federation always desired to be conciliatory where disputes arose, and during the last year they had assisted in the establishment of various boards of arbitration, which would, they thought, do a great deal to remove the trouble caused by strikes during the last half-year.

Mr. MacFarlane, in the course of a long and interesting speech, went on to say that the masters desired not alone a strong organisation for themselves, and they had tested its value and importance, but they gladly welcomed strong

who would be a successful builder "must rise early, and sit up late."

Mr. MacFarlane paid a graceful compliment to the Dublin Association for the way in which the Congress had been entertained. They had, he said, expected of Dublin great things, but Dublin had exceeded a hundredfold anything they had even dreamt of.

The Chairman proposed the toast of the "City and Trade of Dublin."

The Lord Mayor, in reply, regretted the deplorable condition of trade and commerce in Ireland. The country had not been treated as it should be by the Government under which we live, especially in the matter of Army contracts, and only the previous day he had formed one of the deputation which had waited on Mr. Haldane on the matter. His Lordship said that in dealing with the question of the absence of trade and commerce in Ireland, which, as the Chairman had reminded them, in Dublin consisted of the manufacture of porter and whiskey, he, holding the views he did, was treading upon dangerous ground, but he would



Photo by]

MR. JOHN GOOD,  
Hon. Secretary of the Dublin Master Builders' Association.

[Lafayette.

trades unions. As masters they recognised the importance of the position which the unions occupied, and it was their experience that the unions so far from encouraging strikes had diminished their number. It was disorganised labour which was most difficult to deal with, and which led to the bitterest contests. The position of the master builders was to-day one of great difficulty. Competition was never so keen; they looked around, and they saw other great industries—shipbuilding, cotton spinning, the iron and steel trades, and many others—in a state of phenomenal prosperity, and they were confronted in their own trade with a condition of deplorable depression such as in an experience of over fifty years he had never known. Men often entered into contracts to-day saying not "how much shall I make," but "how much can I afford to lose on this contract to keep business going." That was a state of affairs not conducive to self-congratulation. It was a very notable circumstance, when one looked around, to see how very, very few contractors' business endured into a second generation. The man of great and persistent energy who raised and maintained a business seldom found a successor. In a word, he

endeavour to avoid all controversial topics in such a varied assembly as that. He was himself a working man, and, speaking as such, he echoed the views of Mr. MacFarlane, that strong organisations on both sides—for the men they were indispensable; but he gladly welcomed strong organisations of masters. Masters had told him that the trades unions were easier to deal with than individual workmen, and the round table conference he looked to as the solution of many difficulties. The greatest difficulty masters had to contend with were not strong, organised labour unions, but a disorganised rabble of workmen discontented with their lot and unable to alter it. His lordship conveyed to his audience that strong organisations on both sides made for peace and for a more reasonable understanding of each other's views and motives. He said that it was often the vogue to roundly denounce trades unions' leaders for fomenting strikes; few people who had not been through it, as he had, could understand the frame of mind of a strike leader suddenly called on to decide for his fellows as to whether they should strike or not, the principle involved being some question upon which they set great store: he, well knowing



that the heavy burden of the strike would fall, not upon the strikers, but upon the hundreds or, perhaps, thousands of poor labouring men, upon the hapless wives and families and other innocent and disinterested persons. Disinterested persons might give a strike leader credit for some of the conflicting emotions which bore upon him. Personally, his Lordship said he welcomed such conferences, as he believed they would result in much good in regard to not alone the special interests represented, but also in respect of the relations of employer and employed.

Sir Horace Plunkett also responded. He trusted that a powerful Association like theirs would do all it could to assist the Department of Agriculture and Technical Instruction. The Trades' Unions had assisted them in all possible ways, and he trusted their Association would also render all the aid that it could in helping to develop the resources of the country. If the Association would assist them in building up city life on its physical side, so as to cope with the social problems of the concentration of population, etc., they would be giving help which was urgently needed.

Sir Horace also referred, with much satisfaction, to the peculiarly admirable results which had eventuated on his combination of what he termed "his Danish-English Architect" (Mr. W. D. Caroe, of London) and his Irish builder (Mr. James Kiernan), who, together, had given him an especially good house, although it had been brought home to him that there was always a three-cornered duel between employer, architect, and builder.

Sir Maurice Dockrell, whose name was also coupled with the toast, said one of the greatest factors which militated against the extension of trade in Ireland was the disinclination of the middle classes to embark in trade. This was an unfortunate state of affairs, and the sooner it was remedied the better it would be for the country. Whenever, said Sir Maurice, a father had a clever son or sons, instead of putting one or more of them into business, he straightway educated every one of them for already overstocked professions. It was the hall-mark of his respectability! He endorsed what had been said about the unions of masters and men, and he spoke as a large employer of labour.

The great speech of the evening, however, was that of Sir Antony MacDonnell, who also responded for the guests. It has been commented upon in almost every daily or weekly journal in the Kingdom, and has been variously described as "cryptic," "obscure," or "misleading." Sir Antony is a rare speaker, not absolutely eloquent, in the ordinary sense, nor yet very profound, neither is he an ideal after-dinner orator. Nevertheless, there is a directness, a straightness of expression and a self-evident honesty of purpose, that cannot fail to impress, added to which there is an impression conveyed that cannot fail to be realised by the hearer, that he is listening to a great man. Sir Antony, in the course of his speech, said that the buildings with which the members of the Association were acquainted had, at least, good foundations, but in the building in which a person like himself was employed you could get no foundation whatever. They had to take such foundations as previously existed, be they what they might. If they asked him what progress had been made in the last three years in building upon that foundation he was afraid he could only point to one or two great features on which there had been progress. (Applause.) He ventured on the last occasion on which he had the honour of partaking of their hospitality to convey a message and express a warning. The message was one of hope, and it had been fulfilled in the great Act of 1903, which, so far as it had worked, had brought peace and happiness to a multitude of homes, but the warning which he ventured to express on that occasion had been entirely neglected. Whether that warning had been necessary, or is necessary, the future would tell more certainly than he could. But his own feeling was that the country would suffer from the neglect which was paid to that warning. He came before them that night after three years of work, some of which had brought great satisfaction, and some of which had brought regret, and he now came before them as he came before them three years ago with a message of hope. He was no more entitled to tell them that night the grounds on which the hope was based than he was able to tell them three years ago the grounds upon which his hope was then based; but his firm

belief was that the coming year, 1907, would see the fruition of many of those hopes which the best Irishmen had for many years entertained. It might not be the fruition of everything which Irishmen had hoped for, but it would be, he believed, the fruition of so much that Irishmen, if they were true to themselves, would make the fountain and the source from which the whole of their hopes might be fulfilled. He was proud to know that all the efforts of the last three years, all the endeavours, failing though they might have been, had been regarded by his countrymen with tolerance, and he could only hope that in that tolerance encouragement might be found to do in the future everything that one could do to realise the aspiration that Ireland might be able in the near future to realise the hopes that had been expressed that night in such eloquent and encouraging terms. (Applause.)

Mr. W. Mitchell, R.H.A., President of the Royal Institute of Architects, also responded.

Before the conclusion of the dinner, Mr. MacFarlane proposed the health of the Chairman in felicitous terms. Mr. Bolton, in replying, expressed the pleasure it had been to his Association to entertain the National Federation.

We may mention that every member present outside their own ranks was the guest of the Dublin Master Builders' Association. The banquet was one of the best ever held in Dublin, and guests and visitors alike expressed their delight at the successful way in which the week had turned out.

Mr. Good and Mr. Agnew were here, there, and everywhere; hundreds of minor arrangements must have been of necessity made, and the smoothness with which everything worked proves the excellence of the admirable arrangements they made.

During dinner the following programme of music was performed by the band of the 87th Royal Irish Fusiliers (Faugh-a-Ballaghs), under the direction of Mr. A. J. Dunne:—1, Bridal March (from "Lohengrin"), Wagner; 2, Serenade, "Moonlight," Moret; 3, Selection, "The Yeoman of the Guard"; 4, Novallette, "The First Kiss," Schubert; 5, Song, "O Star of Eve," Wagner; 6, Entr'acte, "Love In Idleness," Macbeth; 7, Entr'acte, "The Bells of St. Malo," Rimmer; 8, Excerpt from "Faust," Gounod; God Save the King.

#### Trip to Glendalough.

If the Congress was favoured with splendid weather for the garden party, the same boast could not be indulged in respecting the outing arranged by the members of the Automobile Club of Ireland, who had arranged to convey a number of the Conference party in their motors to Glendalough and the Seven Churches on Thursday. The morning opened badly, and by mid-day thunder and lightning marred the pleasure of the day. It is greatly to be regretted that such inauspicious weather should attend our visitors' trip to one of the most beautiful spots in the Kingdom. Nevertheless, they had the opportunity of conceiving what the scene would be like under happier conditions. Representatives of the Dublin Association attended the party as guides.

#### Visits in Dublin.

Friday was devoted to visits to places of interest in the city, the Bank of Ireland, Guinness's Brewery—the greatest concern of its kind in the whole world. Again the visits were made under the willing guidance of members of the Dublin Association, amongst others Mr. Good, Mr. T. Conolly, Mr. James Kiernan, Mr. Bolton, etc., etc.

By Saturday the Conference was a thing of the past. One and all of those members from England with whom we came in contact were loud in their expressions of praise for the arrangements which had been made for their comfort and entertainment. It must, indeed, be a gratification to the Reception Committee to know how thoroughly their splendid efforts to maintain the old-time reputation of our city for hospitality and consideration for strangers were appreciated. Upon Mr. John Good, the Hon. Sec., fell the brunt of the work, but a word of praise for his indefatigable coadjutor, Mr. Agnew, must not be omitted.

The last enquiry under the old Labourers' Acts was held in Dungannon last week by Mr. Barnwall Crofton, L.G.B. Inspector. The following day the new Act received the Royal assent.

**THE GALWAY MARBLE AND GRANITE INDUSTRY.**

On 18th ulto. His Excellency the Lord Lieutenant concluded his tour in Connemara by formally opening the Marble and Granite Works recently started by a local company in Galway. It was an interesting event, and possibly destined to be an historic one in the terrible uphill struggle towards industrial revival in this country. There is no reason why the industry so well set on foot now in Galway should not rival that of Aberdeen—none, except that it happens to be in Ireland, to which circumstance national as much as international prejudices attach. It can and may grow to marvellous dimensions, for granite is a stone particularly popular and useful for building and decorative purposes, and people have not given over using such materials for such purposes. Some of the finest modern mansions are built and adorned with granite and marble; the most splendid structures raised have them, and the finest public buildings. The monuments in all countries to great men are, inside and outside, usually found to be of that beautiful carved and polished stone, and so durable is granite that the incised hieroglyphics cut on Egyptian monuments countless ages ago are as perfect to-day as if only carved a few years ago. The possibilities of development of this industry are, therefore, beyond measure, and what adds to its advantages and chances is that the available local supply is almost exhaustless, and the facilities for easy and economic quarrying and expeditious and skilled handling, and for transfer, are also in its favour. We are not indulging in any extravagant expectations when we say that we should not be surprised if the annual output from Galway were to run into thousands of tons of finished work. There is now to be found there in working order the most improved, up-to-date machinery for turning, planing, sawing, cutting and slicing the hardest of stones as if it were but wood. The finished products of that process are, needless to say, of the most varied and diverse kind. By means of a turbine, utilising the ample waters of the adjoining Corrib, several wheels are turned for the saws and lathes, and thus the main motive power for the works is at hand without any cost. Very excellent specimens of the other kinds of stone found in that district, particularly of the delicate green serpentine and black Menlo marble, are ready to be cut for any purpose, all of them for beauty of natural colour and tracery unrivalled, thus proving to demonstration the vast possibilities of the combined granite and marble industry if but developed upon the right lines and worked in the proper way, as we have every reason to believe it will be carried out under the present management and directorate. The granite quarried in and about the neighbourhood of Galway is of five distinct and particular colours, varied forms of pink and white, and all of these are capable of taking the most exquisite polish. The Aberdeen granite, which, with our usual predilection for foreign stuff, so peculiar to Irishmen, is so fashionable in our buildings, and which can only be obtained here at great cost, is demonstrably and palpably inferior in its finished appearance to what can be produced and sold at half the expense at our own doors; yet how many of our private and public buildings have in them the foreign stone standing as a reproach to and a lesson of our want of enterprise and our lack of patriotism. Of course it is useless now lamenting these things of the past, and we only mention them that the yet prevailing fashion may cease, and that the practice of going abroad for what can be got at home may not be henceforth found or tolerated in Ireland at any rate. We are not interested, financially, in the Galway works, and our concern for its progress and our hopes for its success are founded on that sound principle of practical patriotism, a preference for native products, which we have always in this paper inculcated, and which we shall continue to inculcate until our pen cease to run. We wish to see the Galway granite and the Galway marble used everywhere and by everyone and in every way encouraged, as we desire equally to have the Galway frieze, cloth and flannel, and even Galway whiskey (if drink is to be taken) favoured in preference to the inferior, imported stuff, and it is only in such a spirit of exclusiveness and protection that any real or permanent industrial headway can be made in Ireland. If the enterprise in Galway

prosper it will itself not only give employment there but even find material for building up an export trade in stone that would induce ships to visit that port for the cargo. It is well known that in America, for instance, there is no granite or marble quarried or available locally comparable to what has been sent there from this country, and from this very country. Even as it is, despite the drawbacks of a want of efficient and cheap means of easy transport, thousands of tons of that stone have been already sent across the Atlantic. The Public Library in Boston is lined with slabs of the peerless Galway green marble, while in the public buildings in Dublin, built at the same time by native hands, are to be found foreign stone in every form of hideous inartistic monstrosity. Many of the finest houses in New York have Galway marble mantel pieces and pillars, while Galway and Irish houses have inside them hideous cast-iron things of foreign stone. The Lord Lieutenant, in his speech on the address of welcome presented to him at the Galway works, mentioned as a curious but significant fact that he had just put into a house he was building in Aberdeen mantel-pieces made of Galway marble. We hope that hint and example will not be lost upon the Department, and that when designing and erecting its new College of Science in Dublin, or any other buildings, it will insist upon native stone, and by preference on Galway marble for their interior adornment. The granite which it is the custom of our degenerate architects to recommend is dull compared with the Galway stone, and one has only to put the two polished pieces in contrast together to be struck with the superiority of the Irish stone. It was said in justification of this unpatriotic preference of the imported article that the same pattern, size and quantity could not be as conveniently, certainly and cheaply got at home, and no doubt our sad want of business habits and the absence of enterprise with us too often did make one think that there was something in that excuse. But it was too often the want of steady, persistent, and systematic encouragement of the native industry at home, on our part, that served to make its supply so unsteady and unreliable in its outcome and results, and one is usually the effect of the other. No doubt in Ireland in these industrial matters we are as children, too fond of change, too unrelenting, and too given to follow others, too attached to the stranger as such, and too suspicious of ourselves. We are too inclined to buy the foreign, because it is such, and to hinder the native, and this childish spirit we carry from our individuals to our industries. This national failing is one of the causes which, after the steady, systematic neglect of successive Governments to encourage and aid any Irish enterprise, has left us as and what we are to-day—in the backwater of human progress, a nation cast aside from the great stream of the world's progress, and, as it were, in an industrial siding away from its real whirl of the world's work, the playground of every good-natured faddist, and the prey of every self-opinionated sentimentalist. We sadly want industrial habits and deplorably lack industrial training, and these we are not getting even now.

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Mr. G. L. O'Connor, C.E., M.R.I.A.I., of Dublin, was amongst those who attended the recent International Congress of Architects in London.

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The Carlow County Council will shortly advertise for an Assistant Surveyor. The appointment will be made on September 3rd.

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The Urban District Council have at present an extensive street alteration scheme in progress, to connect the district near the West Pier with the Crofton-road. They purpose constructing a wide thoroughfare parallel with the railway, so as to relieve the congestion so frequently experienced in the Main-street, along which the tramway runs. It is expected that trees will be planted along the thoroughfare, and that seats will be provided, so that it will form a continuation of the fine roads recently constructed along the Harbour face. The work is being carried out under the supervision and direction of Mr. J. W. Berry, M.Inst.C.E., engineer to the Urban District Council.



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## CEMENT AND CONCRETE.\*

So large an amount of interest and discussion has been stimulated amongst architects, engineers, and builders of late on account of the ever-growing use of these economical, convenient, and plastic materials, that it may be pardonable for us to once more devote some little prominence to the subject. The interest in the question has been greatly accentuated, owing to the fashion in which these materials have been seized hold of, and exploited as specialities in conjunction with steel, by numerous specialists and commercial firms, both in Europe and America, who have devised and patented many methods for their utilisation—some excellent, some useful, others somewhat impracticable or costly, but nearly all possessing some point of merit. As is pointed out elsewhere in our columns, there is a danger of this "fashion," being made a playtoy and source of experiment by architects or engineers but imperfectly acquainted with the properties of the materials dealt with, to the cost and danger of the public. While the experience of the commercial specialists, the pioneers in the use of these materials in conjunction, is useful, and the results of their labours to be respected and gratefully acknowledged, wholesale permanent dependence upon them is not a condition of affairs which either engineers or architects can look upon with feelings either of satisfaction or self-respect. Complete acquaintance with the manifold properties of these materials in combination has not been attained, nor have even the results of many very exhaustive experiments and tolerably comprehensive experience gained by many, become at all widely diffused amongst the professions of engineering and architecture.

Indeed this was very evident from the tone of some of the remarks made at the conclusion of certain papers on concrete read at the recent International Congress of Architects in London. This has in the past been due largely to the want of a literature on the subject. Most of the books in general circulation were, until quite recently, very far from up-to-date, and took little account of the large amount of experimental work that has gone on in America and on the Continent now for a good many years past. This has in recent years been to a great extent remedied, and quite a variety of useful text-books published, including one or two by Englishmen, but in the main we still rely upon America and France for our more scientific knowledge on this question, and for the bulk of the experiments. True, we have in Dublin, even, a gentleman amongst us who, in his day, as engineer to the Port and Docks Board of Dublin, attained a knowledge and experience of the uses and properties of concrete pure and simple, that was not alone varied and extensive, but far in advance of his time. We refer to Dr. Bindon B. Stoney, whose work on "Strains" is an engineering classic. But, speaking generally, Great Britain and Ireland have sadly lagged behind, and it is strange to still find so extraordinary an inacquaintance with what has been done elsewhere, displayed by many in these countries.

Concrete is a material which, as it came into more general use, was subjected to much adverse criticism. This was, in the main, due simply to ignorance. Doubtless, concrete or concrete-steel has, like every other material, its limitations, structural and economical, and the idea that it will ever wholly supplant either stone, brick, timber, or even naked steel, is, to say the least, doubtful. But that it will, and is, daily superseding these materials in many uses for which they were once exclusively employed, that it is dictating new forms of construction and design, and that it possesses special advantages for use in certain situations, is self-evident. It is a mode of construction which, in short, has come to stay. The problem before the designer generally is to know in what situation it is, subject, of course, to our present somewhat imperfect state of knowledge, best adapted for, so as to afford distinct advantages over the more time-honoured materials. It has, for instance, been practically settled beyond controversy that in all fire-resisting constructions it has superlative merits. How far shall it, or ought it to supersede stone or brick in other situations, is a question which must largely be left to the judgment of individual designers. How far it will afford a saving in cost in varied structures must be similarly dealt with; but to answer these problems satisfactorily the designer must first consider the size and object of the work he is designing, and apply to it his knowledge of the newer material. For instance, it is plain that a floor of joists and boarding will be cheaper than a concrete-steel floor. How much better the latter would be, and whether it is worth the difference must again be left to the designer. His judgment will be true or false, as he is acquainted with, or ignorant of, the properties and value of the new material. In London, for instance, there has of late been a tendency, after a long enduring, wooden-headed clinging to old forms of building construction, under every condition of great and small works, to veer right round, and to adopt the steel frame structure with equal indiscrimination. Many American engineers and architects have, we believe, noted and commented upon this fact. In America, we understand, the steel framed building is not adopted unless there is something in the way of height, or other consideration, that points to the steel frame as an economical and durable solution.

The literature of America on concrete and concrete-steel

\* Cement and Concrete. By Louis Carlton Sabin, B.S., C.E., Assistant Engineer Department U.S. Army; Member of the American Society of Civil Engineers. London: Archibald Constable and Co. 1905. Price 25s. net.

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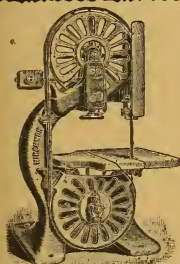
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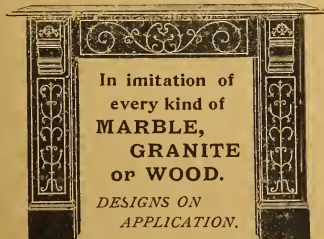
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is now, as we have before observed, pretty extensive, and presents ample material for study.

A work of considerable utility, which has lately been sent us, is entitled, "Cement and Concrete," by Louis Carlton Sabin, B.S., C.E., Assistant Engineer U.S. Army, and a member of the American Society of Engineers. It will be found most convenient for a study of the problems, the uses, and properties of the material, and it records many experiments and some little-known facts relating thereto. The author observes very truly that "the use of cement has outstripped the literature on the subject;" and, again, that "to-day the young engineer frequently finds a good working knowledge of cement one of the essentials of success." Professedly it is not a work which offers an answer to every problem relating to cement, but it affords a pretty large record of practical experience and scientific testing.

Conclusions are summed up in rather convenient form at the end of every set of experiments and tables recorded; for instance, it is stated that to remove the coarse particles from a sample of natural cement, or to reduce them by fine grinding, generally diminishes the strength obtained in neat cement tests. In one-to-one tests the strength is not much greater than when the coarse particles are present; while in concretes or mortars containing greater proportions of sand, the strengths attained by the finer samples sometimes exceeds that of the original cement by more than 60 per cent. The effects of sifting and fine grinding for Portland cement are, of course, generally known, but there does not, according to Mr. Sabin, result so large a proportionate increase of strength.

The author notes the difficulty of securing the adequate admixture of sand and cement, and even distribution of water, in cases where there is a large proportion of sand used. There are in the book useful, if occasionally very elementary chapters upon testing, upon sand proportions, mixing, etc., etc.

A very good chapter is given upon aggregates; gravel, we are informed, makes a good aggregate, but its surfaces are too round and smooth to yield the best results; coarse gravel may be improved by running through a rock-crusher to render it more angular, though we doubt that this would ordinarily be economically practicable. No general rule, says the author, can be laid down as to the relative merits of different kinds of stone. A mixture of gravel and broken stones gives good results, and so do fragments of brick *up to the limits of the strength of the fragments*; but that is not high; granites, trap, and syanite are good. We presume hard granites are meant, as many granites, some of the Co. Dublin, for instance, are rather soft and friable. The author impresses that if a strong concrete is required, a rich mixture will not make up for a defect in the stone used.

For fireproof work, care should be taken to avoid aggregates containing felspar. Limestone should not be used where it may have to resist long continued and strong heat.

To much stress cannot be laid, we are told, upon thorough mixing, as well as grading; "every grain of sand should be covered with cement, and every stone should be covered with mortar;" thorough mixing more than repaying the cost thereof, as the proportion of cement may be correspondingly reduced. Some minute details as to the methods of mixing are given.

As to mixing in frosty-weather, the results in different climates are so varied that no general rules can be laid down.

Generally speaking, however, mortar should not be mixed in low temperatures. Cement mortars may be benefited by the addition of salt—say from 3 to 7 per cent. of salt in the water. Warming the materials has but little effect upon frost-resisting qualities.

The results of the addition of various materials to concrete is noted—for instance, tests showed that while the addition of from one to two per cent. of plaster of paris to the cement had little or no effect, six per cent. absolutely ruined both Portland and natural cement.

Again, the addition of a small quantity of lime paste increases the adhesive strength somewhat, and when as much as twenty-five per cent. of the cement is replaced by lime in the form of paste, the adhesive strength of the natural cement is not materially diminished, while in the case of Portland cement the use of lime paste materially *increases* the adhesive strength of lean mortars. This is a matter worth bearing in mind in connection with the pointing of stone or brick work. Some attention is devoted to the use of what is called "cinder concrete," but the importance of this form of aggregate seems hardly to be realised.

The effects of the introduction of clay are at first sight rather startling, and are summed up—that while 6 or 12 per cent. of clay retards the hardening of both Portland and natural cement, the strength of the Portland concrete after four weeks is *increased* by six per cent. of clay added. The ramming of the concrete is facilitated by the presence of a small proportion of clay, but the effect upon its waterproof qualities are not noted.

The author notes also that it is not now questioned that steel properly embedded in Portland cement concrete is adequately protected, and he tells us of a certain steel wrench, half of which was for twenty-two years embedded in ordinary concrete, and had retained its metallic surface perfectly, while part which had been embedded in coal ashes, had corroded badly.

The work shows a great defect in the disregard of the differences that exist in what the author calls "cinder concrete," by reason of difference in aggregate, and he makes no attempt to differentiate between the best "breeze" and apparently common ashes or cinders.

The consideration of concrete-steel is brief and rather "scrappy," and not worthy of the vast importance of the matter.

There is a considerable amount of information in subsequent chapters upon the use of concrete in various forms of construction.

Generally speaking the work is, as far as it goes, a sound and very useful contribution to the literature of the subject, but we hope to see it considerably amplified in a subsequent edition.

## COMMENTS.

### The Master Builders' Congress and the Conditions of Contract.

As one of a deputation from Belfast, received by the President of the Federation, Mr. J. C. White, solicitor to the Belfast Builders' Association, made some remarks upon the question of the revision of general conditions of building contracts, and commented upon the attitude of the Royal Institute of Architects of Ireland.

Mr. White seems to have spoken under some misapprehension as to the attitude of the Institute. The facts detailed by him accurately described the state of affairs when the present revised conditions were introduced by the Institute of British architects in England in agreement with the Institute of London Master Builders, but the proposition of the Royal Institute of the Architects of Ireland, which he quoted, dates back some years, and the probationary period indicated by them has run its course, since then the Institute has actually taken action, formulating a set of revised conditions. These conditions seem to enlarge, in intention at least, the architect's powers. Not for this reason; but for causes pertaining to ambiguity and weakness of definition, we have ourselves

taken exception thereto, and, indeed, a minority of the members of the Institute partook of our view. However, the Institute has adopted these conditions, and the Association of Master Builders has declared its inability to accept them, while, at the same time, conveying the willingness of the members to sign either the British or the old conditions. The matter stands therefore thus:

That the Institute has adopted the new conditions of contract, which have, however, been rejected by the Association, and to this determination we understand every master builder in Dublin has pledged himself, and so the affair rests. As most of the respectable builders of Dublin are members of the Association the situation is more or less thinned. What will ultimately eventuate no man can tell.

As we have again and again pointed out, a builder is far safer in the hands of an architect possessed of arbitrary "final and binding" powers under the contract, provided he is an honest man, than with an involved contract embodying an arbitration clause. Any gain a builder may receive under arbitration proceedings will inevitably be purchased at the price of much law or arbitration costs.

The old conditions had many defects, chief amongst which was the fact that no ordinary man could thoroughly understand them, or reconcile the inconsistencies of expression. In a word, they are bad law, and bad amateur law at that.

Only last week we heard one of the oldest and most distinguished Irish King's Counsel describe the old general conditions as "the fruitful parent of much litigation." At the same time no clauses tending in the slightest degree to weaken the absolute control of the architect over his own building are either necessary or desirable. Automatic control is necessary on the part of somebody, and the next person to exercise it is the architect. Nevertheless, it ought not to be impossible to devise a short, simple and acceptable set of conditions.

#### London Tramways Purchase.

In a recent issue, the "Light Railway and Tramway Journal" mentions that the London County Council has at length determined to exercise its powers of compulsory purchase with respect to the undertaking of the London Southern Tramways Company. The system extends from Westminster Bridge through South Lambeth, Vauxhall, Camberwell, and out to West Norwood, and when taken over electric traction will be introduced.

A provision exists in the Company's Act making applicable the Arbitration Clause contained in the General Tramways Act of 1870. The next step is to have the purchase price determined by arbitration, and the Council and the company have jointly selected as arbitrator Mr. L. L. Macassey, B.L., M.Inst.C.E., of Belfast, who acted in a similar capacity in connection with the taking over of the Belfast tramways. This looks like carrying the war into the enemy's country!

Lovers of garden and garden-craft will be interested to know that Mr. Banford some time since published a second edition, revised and enlarged, of "The Art and Craft of Garden Making," by Mr. Thomas H. Mawson, Garden Architect, whose work is so well known in England, and doubtless also familiar to our readers also. It is a fact not always recognised that in the making of a garden, the suitable arrangement of the setting of the house, there is necessity for a thorough knowledge on the part of the designer, only to be gained by the closest study of the best examples. The design of garden should accord with the design of the house, just in the same way as the furniture and decorations ought to be in agreement with it—or at all events not clash. Mr. Mawson's reputation as a garden architect is of the highest, and a perusal of his pages, with their beautiful illustrations, will be found most useful and suggestive, and helpful in counteracting the influence of many of the so-called

"landscape gardeners," whose main idea of a garden is often summed up in a series of tortured, meandering walks and artificial rocks.

The current "Master Builders' Association Journal" contains some interesting notes upon the rebuilding of San Francisco. We are told that plans have been prepared for scores of fine large structures, and announcements of their early construction given with more or less detail, but pending a definite understanding on these matters and the question of widening the streets, things have been very much "up in the air," and only a few high-class permanent buildings have been commenced. The wholesale traders are already busily at work in temporary structures, and repairs have been begun upon many buildings which were not wholly destroyed. Much trouble has been experienced by owners, owing to delays by the insurance companies in settling claims, and in some cases to their refusing to allow debris to be disturbed. In many instances temporary roofs have, therefore, been put upon the mined structures. Temporary buildings command enormous rents.

The local contractors who had partially completed buildings upon their hands at the time of the earthquake have suffered severely, and now they have to face the competition of large firms of "hustling" contractors from the East, who loudly proclaim their superior and up-to-date methods, and the rapidity with which they can work. The 14-storey Merchants' Exchange building, occupied by numerous lumber offices, was built in record time from eastern plans and largely with eastern materials, but it also burned out in record time. Its supposed fireproof vaults on all floors proved worthless, causing terrific losses of valuable papers and records. The records of the Southern Pacific Railroad Company, which occupied nine floors of the structure, extended back for thirty years, and some of those relating to its land department, etc., were of vital importance and cannot be replaced.

#### IMPORTS.

##### PORT OF DUBLIN.

July 25—Per City of Liverpool, from Ghent, 7,500 bags cement, 7 cases marble, to order; per Lady Martin, from London, 1,800 sacks cement, T. Dockrell, Son and Co., Ltd.

July 26—Per Val de Travers, from Treport, 150 bags Plaster of Paris, to order; per Result, from Chester, 180 tons bricks, T. and C. Martin, Ltd.

July 28—Per Problem, from Chester, 105 tons bricks, J. M'Ferran and Co.; per Jessie, from Glasgow, 100 tons bricks, M'Naughton and Co.; per Lady Wolseley, from London, 880 sacks cement, J. M'Ferran and Co.; 650 sacks cement, T. Archer.

August 1—Per Glenam Head, from Montreal and Quebec, 21,765 pcs. firewood, sawn, to order; per Orithia, from Miramichi, 61,614 pcs. deals and ends, T. and C. Martin, Ltd.; per Viola, from Belfast, 210 tons bricks, W. S. H. Guilford; per Lady Hudson-Kinahan, from London, 600 sacks cement, R. Martin and Co.

August 2—Per Catherine Latham, from Chester, 130 tons bricks, T. Archer.

August 3—Per Elsinore, from Fredrikstad, 46,101 pcs. planed boards, 3,080 pcs. battens, W. and L. Crowe, Ltd.; 220 poles, 1,000 bbls. laths, J. Kelly and Son; per Enid, from London, 185 tons cement, W. and L. Crowe, Ltd.

August 4—Per St. Tudwell, from Port Dinorwic, 183 tons slates, Brooks, Thomas and Co., Ltd.

August 7—Per Unity, from Port Madoc, 105 tons slates, Corry and Co.; per Elidir, from Newcastle, 400 tons cement, J. C. Johnston and Co.; per City of Brussels, from Antwerp, 55 cases window glass, H. Sibthorp and Son; 50 cases do., T. Dockrell, Son and Co., Ltd.; 50 case do., J. Arigho; 37 cases do., A. Bassi; 6 cases do., Meyer Ross; 137 cases do., Brooks, Thomas and Co., Ltd.; 7 cases do., Hoyte and Son; 5 cases do., Combridge and Co.; 115 cases do., to order; 253 steel joists, do.; 4 cases limestone, do.; per Minerva, from Oporto, 1 case roofing slates, to order.





**Belfast.**—On Thursday last His Excellency the Lord Lieutenant opened the new Belfast Corporation Fever Hospital at Purdyshurn. Dr. King Kerr, in welcoming His Excellency, said that they selected the architects in the first instance—Messrs. Young and McKenzie—and instructed them to visit different parts of the Kingdom to get the latest ideas with regard to such institutions. Mr. McKenzie threw himself into the work in a whole-hearted way, and his idea was carried out most successfully by Messrs. Robert Perry and Son, the contractors. The building was now complete, and they hoped that the administrative block would be sufficient for the medical and nursing staff for all time. With regard to the accommodation for patients, provision had been made for present requirements, leaving to the future to decide what may be necessary with regard to additional buildings. His Excellency would soon have an opportunity of seeing the building and its internal arrangements, and he would probably be of the opinion that it was one of the best hospitals of the kind in the Kingdom, and that it was erected on a site which was unrivalled. His Excellency spoke in very appreciative terms of the new building, and in every respect the hospital seems thoroughly equipped, and everything necessary to provide for the comfort of the patients has been supplied. Accommodation is at present provided for one hundred and sixty patients, but it is in contemplation to increase the accommodation so as to provide for 350 patients. The building, which cost £75,000, is constructed of red brick with Glasgow stone dressings, and is covered with Staffordshire tiles. It is elevated about six feet above the ground, with a view to preventing the entry of germs. It is heated all through by a system of hot water pipes, and there are open fireplaces in each ward. Each ward is divided by a nurse's observation room, which is placed in the centre, and one side will be occupied by males and the other by females. The administrative block has accommodation for two doctors and fifty nurses. There is a laundry attached to the hospital for washing the clothes of the patients and the staff. Arrangements have been made for conveying the food to the patients from the kitchen by an underground passage. A handsome gold key was presented to the Lord Lieutenant by Dr. King Kerr.

A scheme was set on foot at the annual meeting of the Belfast Hospital for Skin Diseases to perpetuate the memory of Dr. H. S. Purdon's work in connection with the institution, by making an addition to the building.

**Bray.**—Mr. Alexander Frazer, contractor, of Bray and Kingstown, under the supervision of Mr. J. C. Wilmot, architect, Merrion-street, Dublin, is at present engaged in re-modelling at Bray two houses, formerly a shop and post-office. They have been purchased by the Northern Banking Company, Ltd., for their new branch office. When finished the front will present a very handsome appearance. It will be of limestone, reaching to the window-sills of the first floor. The limestone has been supplied by Messrs. Pettigrew and Son, Ardbraccan, Navan.

**Carrick-on-Suir.**—CARRICK-ON-SUIR UNION.—No. 2 District Council will to-day, 11th August, consider tenders for the erection of 17 labourers' cottages in the district.

**Co. Dublin.**—Mr. J. Groves Clayton, Mercantile Buildings, 18 Nassau-street, Dublin, is at present taking out quantities for a residence in Dalkey for Dr. Carnegie. Mr. Webb is the architect.

New school buildings will shortly be erected at Crysfort Convent, Blackrock, according to plans and specifications prepared by Messrs. W. H. Byrne and Son, 20 Suffolk-street, Dublin. Mr. W. Morris, 68 Harcourt-street, Dublin, is the quantity surveyor, and tenders will shortly be asked for.

**Dublin.**—Mr. J. C. Wilmot, M.Inst., C.E., M.R.I.A.I., has prepared plans and specifications for the rebuilding of 173 and 174 North strand, together with a house and cottage at Aldborough-court and Seville-lane. Messrs. Enright and O'Connor are the contractors, and the work is in progress.

**CORPORATION OF DUBLIN.**—The Public Health Committee invite tenders for calorifiers, drying houses, economiser, and masonry work, in connection with the steam generating

apparatus and hot water supply at the Baths and Wash Houses, Tara-street, Dublin. Copies of the plan, specification, and form of tender may be obtained in the City Treasurer's Office, on lodgment of £3, which will be returned to contractors who submit a *bona fide* tender. Tenders to be delivered on August 13th, 1906.

Messrs. J. Pemberton and Sons, Charlemont street, Dublin, are at present rebuilding Nos. 66, 67, 69 Grafton-street, for Mr. Wm. Leybourne Murphy, Mrs. R. G. Lewers, and the Singer Company, Ltd., respectively. The frontage of each house will be 24 feet, with Kingscourt facing bricks, terra-cotta dressings, with bay windows to first and second floors. The two windows of each building on the top storeys are to be semi-circular heads. The buildings will be finished with a terra-cotta balustrade. The plans and specifications have been prepared by Mr. L. A. MacDonnell, M.R.I.A.I., 9 Hume-street, Dublin.

Messrs. Leverett and Fry are also rebuilding their premises in Grafton-street. Messrs. H. and J. Martin are the contractors, Mr. L. A. MacDonnell, 9 Hume-street, Dublin, being the architect. Owing to the desire of the proprietors to carry on business during alterations, work is being proceeded with at the back, but a new front will be added shortly.

The Rathmines Council, under the supervision of Mr. F. P. Dixon, M. Inst. C.E., are erecting a new morgue for the use of the district. This will relieve the licensed victuallers of the locality, who, in the absence of such a building, are bound to provide a place for the holding of inquests.

Tenders will be shortly invited for increasing the width of the premises occupied by the American Shoe Co., Grafton-street; also putting in new stairs and opening an entrance in Grafton-street, according to the plans and specifications of Mr. George J. Moore, Foster-place, Dublin.

The New Training College, Glasnevin, now in course of erection for the Commissioners of National Education, will be an imposing and palatial structure when completed. Situated as it is on the brow of the rising ground, close to the terminus of the Dublin Tramway Company, it commands a magnificent view of the surrounding country. The building itself is of Gothic architecture, rising to a height of three and four storeys. It has a frontage of 270 feet and a depth of 152 feet, and is faced with Ballyknocken granite and dressings. The class-rooms and dormitories are lit with mullion and transomed windows, with steel casements. The Principal's residence will be in the south-east corner, and the matron's will also be situated in the south-east end. The entrance to the front will be through a port-cochere, while the main staircase of granite will have a very stately and imposing effect. The main dining hall will be large and elaborate, being 90 feet long by 32 feet wide, which will be situated in close proximity to the kitchen. The building is fireproof throughout, while all the ironwork therein is of home manufacture. So fast has the building progressed, that it is difficult to realize that it is only since the end of last September it was properly under way. Messrs. Henry Laverty and Sons, Cambridge-street, Belfast, are the contractors, Mr. R. M. Guinness being the clerk of works. The works are under the direction and supervision of Mr. J. Franklin Fuller, F.S.A., 179 Great Brunswick-street, Dublin, who is responsible for the plans and specifications.

The directors of the Great Northern Railway are prepared to receive tenders for—(1) Three timber smoke troughs, each 126 feet long; and (2) for slating of roof. Parties wishing to tender for the works may see the respective drawings and specifications at the office of Mr. W. H. Mills, Engineer-in-Chief, A. miens street.

**Drogheda.**—Some time ago the idea of providing a Cottage Hospital for Drogheda originated in the minds of the Misses Smith and several prominent ladies of the surrounding district, and a public meeting was held, and a committee was appointed. The committee are now in a position to start building operations.

**Fermanagh.**—Tenders were received by the committee of County Fermanagh Farming Society for the fitting up of Show grounds.

**Fermoy.**—Tenders were received for alterations and additions to the residence of the Christian Brothers, Fermoy, in accordance with plans and specification prepared by Samuel F. Hynes, F.R.I.B.A., 21 South Mall, Cork.

**Kinnegad (Co. Meath).**—The Lord Bishop of Meath (Most Rev. Dr. Gaughran) laid the foundation stone of the new R.C. Parish Church at Kinnegad, Co. Meath, on Sunday last. Mr. J. F. MacNamara, of Dublin, is the architect.

**Co. Kildare.**—A handsome house is being erected near Newbridge for Captain Graham, from the designs and specifications of Mr. Webb, M.R.I.A.I., Clare-street, Dublin. The builder is Mr. P. J. Byrne, Newbridge.

Mr. Byrne has also just finished erecting a hunting stable at the edge of the Curragh for the Woods and Forest Office, according to the designs of Mr. Webb.

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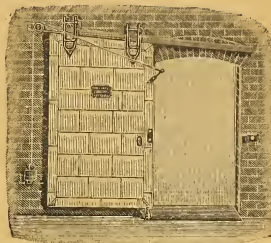
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**Lismore.**—MR. CARNEGIE OFFERS £3,000.—Mr. Carnegie has written to the Lismore Libraries Committee offering to pay £3,000 sterling for the erection of four branch library buildings for the rural district of Lismore provided a penny rate is levied at once, so as to have money in hand for books, etc., and the proceeds, not less than £210, be devoted to the upkeep of libraries in said buildings. Sites must also be given free, the cost of them not being a burden on the penny rate. The offer was accepted, and it was decided that the grant be allocated as follows:—£2,400 for the erection of a central library at Lismore, and £200 for the erection of each of the subsidiary libraries at Tullow, Cappoquin, and Ballyduff.

**Lissan (Cookstown).**—Tenders will shortly be called for building a new church at Lissan, Co. Tyrone. The architects are Messrs. Ashlin and Coleman, Dawson-street, Dublin.

**Newry.**—ST. PATRICK'S CATHEDRAL, HILL-STREET, NEWRY.—THE CATHEDRAL OF THE DIOCESE OF DROMORE.—Two years ago the Most Rev. Dr. O'Neill conceived the idea of enlarging the sanctuary, which was quite inadequate for the carrying out of the full ceremonies of a Cathedral Church. Messrs. Ashlin and Colman gave the design for the improvements, which consisted of taking down the chancel gable and sacristy, extending the sanctuary 40 feet (thus giving also additional depth to the side chapels) a pentagonal apse round the sanctuary lighted by two long lancets, the insertion of additional windows, and the rebuilding of the sacristy at the back of the north transept. Mr. Denis Neary, builder, Newry, was declared contractor, and the improvements are now fast approaching completion. Owing to the position of the site the foundations had to be sunk a depth of 10 feet from ground level by 5 feet wide, so as to secure a firm footing for superstructure. The foundations are of cement concrete. The walls of superstructure are built of finely-punched ashlar in course—the plinths, weathering under all of the windows, buttresses, dressings of windows and doors, cornices, architraves, etc., being in finely axed Newry granite. The approach to the sacristy is through a massive oak-framed and sheeted door. To vestibule on the left hand are doors, one leading to stairs by which the Confraternity room is reached, and the other to the sacristy. The sacristy ceiling and walls are wainscoted in framed panelled and moulded Austrian oak, with sunk recesses for presses, lavabo, and safes, a finely wrought and richly carved vesting press, with tabernacle and drawers to contain vestments, etc. In the heating chamber, which is the full length and breadth of the sacristy, heating is on the small bore pressure system, worked by two tubical boilers. Messrs. Musgrave, Belfast, are the contractors. Through a doorway, at the end of the passage, one passes into the Lady Chapel. The doorway is of finely-combed bath-stone, with oak-panelled door and trimmings. The Lady Chapel is lighted by 23 light tracery windows on the side, and one at the back of the Lady Altar. The internal dressings of inside sill, plinths, bases, angle moulding and caps with deeply moulded arches, hood mouldings, moulded and string running round at sill level, are all of bath stone from the famous Corsham Down Quarries. At the east end, under the window, is the Lady Altar in Sicilian marble; the antependium and groups in redos are in statuary—the former in richly-carved foliage, lilies, and roses, with monogram; and the latter representing the Annunciation and Coronation of Our Lady—all in "alto relievo." The Chapel is in two bays, divided by a wall shaft for carrying groining on ceiling, the plinths, bases, and annulets being grey and columns of red granite, highly polished, the capitals being of bath stone artistically carved; natural foliage treated wreath-shape rounding the bell of the cap. The dado is flush-panelled, the groining of Porta-Santa and Breccia alternately and panel Rosso. The cap moulding is of Blanc pei. The blending of the different colours gives a very artistic effect. Over the capping and up to string are panels in Mosaic, with medallions in Venetian, representing emblems of the Litany, the shading of the foliage being ceramic. At each side of the doorway in the arch are the Papal and the personal arms of the Holy Father, and of the Diocese of Dromore and the Bishop, in heraldic colours. We are still in Our Lady Chapel. The pavement will be in ceramic mosaic of a rich pattern. The ceiling of the chapel, as well as the ceilings of sanctuary, apse, and St. Joseph's, are all groined in fibrous plaster, with foliage bosses at joinings of groins, with ribs all natural foliage, vine, Passion flower, and oak in the same material.

**Queen's County.**—The Churchwardens and Select Vestry of Offerlane Parish invite tenders for the repair of Laccá Church, in accordance with specifications which can be obtained from the Rev. F. J. Hartley, Offerlane Church, Mountrath, Queen's County.

**Sligo.**—Mr. George Williams is at present erecting a new saw mill plant in his extensive premises at High-street, Sligo. We notice that Mr. Williams is also carrying out a number of improvements in his house property in John-street.—*Irish Independent.*

## LOCAL GOVERNMENT IN SCOTLAND.

Our contemporary, *The Architect*, records an appallingly callous, not to say cruel, piece of jobbery, which proves that our Irish local authorities are not any worse than English or Scottish authorities, but decidedly better on the whole. Mr. Mackison (who until recently has been Borough Surveyor of Dundee), "in addition to his ordinary duties, has acted as Parliamentary engineer. Payment for the extra duties was evaded, and ultimately he was compelled to take proceedings to recover his fees. He also declined to act as Parliamentary engineer in the present session without extra remuneration. To do otherwise would be to raise a prejudice against himself in the law courts. The Town Council thereupon resolved to suspend him from his office of burgh engineer for four months. That period will soon come to an end." Mr. Mackison appears to have served his Council faithfully and well for a long period of years. It would seem he prepared certain Parliamentary plans, which undoubtedly do not come within the ordinary scope of a borough surveyor's duties, and, not unnaturally, he sought some reward therefor. The Council, for unexplained reasons, declined to pay, and Mr. Mackison took legal proceedings; his Board retorted with three months' notice, and resolved that:—

"Mr. Mackison should at once be dismissed, three months' salary being paid to him in lieu of notice." The grounds alleged were that the age of Mr. Mackison prevented him rendering service to the Corporation, and in the interests of their constituents the Corporation were bound to act decisively. Mr. Mackison, in a letter dated the 18th ult. to the Town Clerk, says:—"I am not aware of any instance where an official in my position, and after such services, has been treated in such a manner as I have been, and with so little consideration, and I would sincerely hope that the Council may yet think better of what they have done, and reconsider their action towards me."

The appeal of Mr. Mackison is a strong one, and to any ordinary body of men would not be without some resultant effect. But Councils seem to be the same the world over, differing only in degrees, and adhered to their vindictive action, of which no explanation was forthcoming. No complaint seems hitherto to have been urged against Mr. Mackison until he attempted to assert his legal rights.

The sympathy of the whole profession of engineers and architects ought to be with Mr. Mackison; and it is to be hoped that even now, at the eleventh hour, the Council may see their way to act the part of honest men. Even if Mr. Mackison were not justified in instituting proceedings against his Council, and that is a matter of opinion, their action, on the face of it, seems to be harsh in the extreme.

The statement that the Northern Banking Co., Ltd., are erecting new premises in Amiens-street is incorrect. They are, however, opening a new branch at Bray.

The fine oak panelling, fittings, galleries, seats—in fact, the whole of the interior oakwork for the Council Chamber and Committee Rooms of the new City Hall in Belfast, besides a very large portion of the office fittings, was executed in Manchester by Messrs. Goodall, Lamb and Heighway, Ltd., who have recently been doing such a large amount of public work.

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# ENGINEERING SECTION.

## ITEMS.

The Arterial Drainage Commission has during the past week been collecting local evidence, visiting those towns which may be considered as centres of the areas concerned. It is difficult to anticipate with any degree of certainty what the result of the Commission will be, but it is more than probable that additional control will be placed in the hands of the County Councils. It is not expected that the report will be issued much before the end of the autumn.

It is noteworthy that at a meeting of officials of the Irish Railway Companies, held at the Clearing House, much surprise was expressed that no thoroughly qualified representative of railway interests had been given a place on the Commission, which will shortly commence its session. Strong representations are to be made to the Government as to this omission, and certainly it would be more satisfactory if the inquiry did not partake so much of the nature of a court.

The pneumatic system of sewerage, known as the "Liemeur," which was installed about two years ago at Stansted, Essex, has now received the official approval of the Local Government Board. Instead of the usual gravitation method adopted in the water carriage systems, the sewage is drawn to the outfall works by pneumatic suction, and this scheme is therefore most useful in districts where the ordinary falls are unobtainable. The system being a novel one in the United Kingdom, the Local Government Board withheld its approval pending two years' successful working, and now that the Board has passed the system, it may safely be inferred that it has answered all expectations.

There are at present so many Commissions actually in being, or in process of formation, that it comes as a relief to find one of them has published its report. We may well leave the findings of the Royal Commission on Motor Cars to the journals directly interested in the result of the inquiry, and there is little doubt that the report will afford them a topic of discussion for a long time to come. There is one novel item, however, which will appeal generally to County Surveyors throughout the Kingdom—that is, the suggested application of a graduated tax on cars to the improvement and maintenance of the public roads. It is highly probable that steps will be taken to transform this idea into concrete shape, nor do we think much antagonism will be shown by motor car owners. The proposed tax varies from £2 2s. per annum for cars weighing unladen, not above twelve cwt. to £8 8s. for cars weighing not above twenty-five cwt., trade and public service vehicles being taxed at one-half. Owners of motor cycles will have to pay £1 per annum. From nearly every point of view this section of the report appears to be eminently satisfactory. The increased annual expenditure of the owner will be recouped by a considerable saving on car maintenance, if the roads are repaired efficiently, and the acerbity of the public towards the motorist will doubtless be mitigated when the dust nuisance has been overcome, and it is considered that the car-owner pays more than his proper share towards the Urban or Rural rates. To the County Surveyor, the annual income placed at his disposal for a specific and much-needed improvement will bring him peace of mind, for there is little question that the present deplorable condition of road surfaces, especially in Ireland, is due to a starvation policy. It is, therefore, sincerely to be hoped, for the benefit of the public at large, and the motorist in particular, that this graduated form of tax will be improved, and that the condition of our highways will no longer be a byword. It will, however, be essential that the funds thus accumulated will be carefully guarded and applied only to that purpose for which they are designed; if free libraries, swimming baths, refuse destructors, and other fruits of municipal enterprise are open to endowment, the results may not be so blissful. It now only remains to impose a small tax on cyclists, excluding those whose income falls below a certain figure, and a wealth of revenue will be tapped. That those who use the roads in luxurious travel should pay for the roads, may be a somewhat Socialistic theory, but it certainly appears equitable.

The interesting memorandum recently issued by Sir Henry Tanner, F.R.I.B.A., chairman of the Reinforced Concrete Committee of the Royal Institute of British Architects, gives an idea of the nature and scope of the investigations under consideration. The insularity and aloofness of British architects and engineers is at length being overcome, and, some ten years behind their American and Continental brethren, they are beginning to use this essentially twentieth century method of construction. It is, therefore, a matter for congratulation that such a responsible body as the R.I.B.A. is about to inquire into the question of the utility of reinforced concrete, and to make a pronouncement thereon. Such a pronouncement at an early date is most desirable, but we fear that the report will not have proper weight with engineers, owing to the lack of official representation of their profession. It is, however, quite possible that the report will deal generally with the question of the employment of reinforced concrete, and point out the necessity of a more detailed investigation by a committee of wider representation, aided by a Government grant. As the use of these "systems," owing greatly to advertisement, is becoming "fashionable," it may confidently be expected that many architects and engineers with scanty knowledge of the subject will be found dabbling in reinforced concrete. Some authoritative details and data should, therefore, be forthcoming at an early date, or a serious catastrophe may hinder the development of this construction for another quarter of a century.

An Assistant Commissioner to the Board of Trade, Mr. Wilson Fox, gave some interesting evidence at a sitting of the Select Committee of the House of Commons on the Housing of the Working Classes Acts (Amendment) Bill. Assuming the average cost of erection of an agricultural labourer's cottage to be £150, he showed that, provided that the rent of the cottage was two shillings a week, such undertaking would not be remunerative to a local authority unless the money could be borrowed at 2 per cent., and the loan extended over a period of sixty years. As it is impossible to raise a loan on these terms, he thought it a perfectly sound proposition that the Government should advance money at this rate of interest on the ground of the necessity of public health. He suggested that the requisite funds should be obtained from the taxation of land values in towns, maintaining that if the unearned increment due to the gravitation of the population to the towns was taxed, some portion of the sum thus obtained should be devoted to great national purposes. In the large cities slums and rookeries should be abolished, and in the suburbs the land should be opened up for housing purposes, while in the country parishes cottage building should be proceeded with. The idea of appropriating taxation of this character in the manner described is not perhaps original, and is somewhat Utopian in character, but the necessities of the submerged rural population are but little less in evidence than those of the lower classes in a city. It seems scarcely fair that the relief of the former should be thrown upon sparsely inhabited country districts. A national grant of such a character would possibly be viewed as a species of outdoor relief, but no sentimental consideration should be permitted to stand in the way of carrying out any scheme which will help to keep the agricultural labourer on the land.

Much surprise has been evinced in the engineering profession that the Royal Commission on Sea Coast Erosion only includes one expert on the subject. The composition of this Commission appears to be extraordinary, when the purpose for which it has been called together is considered. One engineer, who has made the question his special study, would have rendered yeoman service—we refer to Mr. F. Latham, of Penzance, who some few months ago, it will be remembered, read a most interesting paper on the subject of sea coast erosion before the members of the Institute of Civil Engineers of Ireland. Mr. R. G. Allanson-Winn is another engineer whose knowledge would prove of high value to the Commission. Mr. Allanson-Winn has made practically a life-study of this important question, as is shown by his learned and exhaustive papers on a very difficult question. It is, moreover, to be regretted that there is no direct representation of Ireland on this Commission, which is dealing with a matter in which the inhabitants of many parts of our coasts are vitally inter-



ested. It is, however, possible, that the evidence of those gentlemen, and of others of their professional brethren, will be tendered during the proceedings. The Commission recently opened, under the presidency of the Hon. Ivor Guest, the first witness examined being the Hon. T. H. W. Pelham, C.B., Assistant-Secretary to the Board of Trade. His evidence went chiefly to show the powers possessed by his Department over the foreshore in the United Kingdom, and, in the course of his examination, he stated that the Board of Trade had not undertaken any considerable work of coast defence owing to lack of funds. All that had hitherto been accomplished was the prevention of the removal of shingle. A great difficulty in executing work for the preservation of the foreshore was the rights of adjoining owners, whose consent had to be obtained. During the last few years the Board of Trade had adopted the practice of granting short leases of foreshore to local authorities for the purposes of control, and the authorities could make by-laws under the Public Health Act, regulating the use of the foreshore, and could prohibit the removal of materials. The coastguards were instructed to report to the Board of Trade as to such removal. He considered that the law should be altered to give one department, subject to Parliament, complete control of all foreshore, whether the soil was vested in another department or in private owners, whose interests would, however, in any case have to be considered. At present, loose material, such as shingle, was under the jurisdiction of the Board of Trade, but fixed material, such as rock, was under that of the Woods and Forests.

### CORRESPONDENCE.

#### THE FOXROCK DRAINAGE CONTRACT.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—I note in your issue to hand that Mr. P. Dowd is declared contractor for the Foxrock drainage. I am of opinion that the Local Government Board should know the reason why a local man, of fair standing, being a ratepayer, and under the accepted tender, should be passed over.

Yours, etc.,

A LOVER OF FAIR PLAY.

Card enclosed, but not for publication.

#### REINFORCED CONCRETE FLOORS.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—I hope the following may be of sufficient interest to you to insert as a news item in your valuable publication.

Yours, etc.,

L. SERRAILLER,  
Manager.

Patent Indented Steel Bar Co., Ltd.,  
Queen Anne's Chambers,  
Westminster,  
London, S.W.,

27th July, 1906.

On July 25th a reinforced concrete floor of slag concrete, reinforced by indented bars constructed by the Patent Indented Bar Co., of Queen Anne's Chambers, Westminster, S.W., was tested by the British Fire Prevention Committee at their Regent's Park Testing Station, with a view of obtaining the standard of fire resistance known as "Fully Protective" (Class B), which necessitates the application of fire to a temperature of about 1,800 deg. Fahr. for a period of four hours, followed by the application of water for five minutes, the load on the floor being 2½ cwt. per foot super.

The floor under test covered a space 15 ft. x 22 ft. 3 ins., the area being divided into three bays, and there being two reinforced concrete beams of 15 ft. span.

The test was conducted under the Committee's usual procedure by a special Sub-Committee. The Committee's Council was represented by Sir James Williamson, C.B., late Admiralty. Various Government departments and municipal authorities interested were represented. The Chairman of the Executive and the Gen. Hon. Secretary received the members and visitors.

#### THE NEW LABOURERS' BILL.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—Doubtless your subscribers will read with much regret the recent editorial comment of the *Freeman's Journal* upon the addition of a clause, at the instance of the Chief Secretary, relating to the employment of architects, engineers, and surveyors to carry out work under the Act for the District Councils, which provides that every person so employed shall satisfy the Local Government Board that he is qualified to discharge such duties. Mr. Redmond declared in the House that "he did not like the clause," and I can quite appreciate his view, that it is inconsistent for an Irish member who has sought to enlarge

the powers of local bodies to now confer more or less of a power of veto upon the Local Government Board: that would seem to be the sole objection: with the proposition that a man should be competent to perform the work he undertakes, and is paid for, no one can quarrel. So far as architects are concerned, all they complain of is that men who have not the remotest semblance of title to pose as architects should be permitted to enter into competition with and obtain commissions as against other men who have devoted time and money to acquiring a knowledge of their calling and in serving a legitimate apprenticeship thereto. Surely it is as much to the interest of the District Councils, the labourers, and the ratepayers generally, as of anyone else, to secure the best service obtainable. The only point that remains is, who is to be judge? So far as architects are concerned, that is not a very material point. The Local Government Board seems to afford a convenient machinery and ready-made facilities for ascertaining the facts. But, doubtless, architects would be equally well satisfied with any other independent tribunal representative of the County Councils, if any such body would undertake the duty of sifting the pretensions of candidates.

All that architects ask is recognition of their calling, and at least the same treatment as the tradesman receives: the properly qualified carpenter will not work at the bench with what he is pleased to describe as "Scab" Labour, and the State has recognised that feeling by the fair wages resolution of the House of Commons.

As regards the contention that an architect's functions in connection with a labourers' scheme are insignificant, I, with some experience, venture to assert that they are quite as responsible as those in connection with any of the other works mentioned by the *Freeman's Journal*. From the inception of a labourers' scheme to its final stage, the duty is one of great responsibility, demanding much care, tact, skill, and even enthusiasm.

I sincerely trust that no Irish member will seek to weaken the effect of this small measure of justice to a hard-worked and somewhat slighted calling.

As to the suggestion that this clause is calculated to add to the cost, such is not the case. An unqualified and ignorant architect is not an economy, and he is dear at any price. Even if a qualified architect's fees are a little higher—and, goodness knows, they are moderate enough—the added value of more skilful and economical planning and more competent supervision are surely worth something.

Yours, etc.,

R. M. BUTLER,  
Architect.

Dublin, 1st August, 1906.

#### STUDENTS' WORK

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR SIR,—In the issue of the IRISH BUILDER AND ENGINEER, for the 28th July, some illustrations are given of A.A.I. prize designs, about which a little friendly criticism may not be amiss.

Students should aim at accuracy of draughtsmanship and clearness of description. The drawings of a gate lodge bristle with inaccuracies, of which the most glaring is the complete reversal of the back elevation, and the transparency of the roof which allows the chimney shaft to be seen through it.

The position of the table shown on the plan of a National School is interesting. It is simply copied from the type plans issued by the Board of Works, and is an absurdity.

Yours truly,

DE SILVA.

4th August, 1906.

#### ARCHITECTS' CONFERENCE.—FIRST FRUITS OF REGISTRATION

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—With reference to your account, in last issue, of the proceedings at the International Congress of Architects, London, no mention is made of Ulster architects attending; and, as these are strong supporters of such a movement, it is only just to be known that the following were present at the Congress, viz.:—Messrs. J. J. McDonnell, J.P., President, Ulster Society of Architects; W. J. Gilliland, F.R.I.B.A.; N. Fitzsimons, A.R.I.B.A.; F. H. Tulloch, A.R.I.B.A.; R. M. Young, J.P., M.R.I.A.I., a son of Mr. Young, and J. Barrett Robinson.

With reference to your editorial comment, entitled "The First Instalment of Registration," in same issue, it is not generally known, as it deserves to be, that Mr. Bryce's action in limiting District Councils to the employment of competent architects, etc., under the Irish Labourers' Bill was procured by the Ulster Society of Architects, bringing strong power to bear on the Chief Secretary (it is an open secret, and need not be concealed), through one of their members who is a relative of the C. S.'s.

Yours, etc.,

YOUR NORTHERN CORRESPONDENT.

## THE NEW CITY HALL, BELFAST.

### SPECIAL DESCRIPTION BY OUR OWN CORRESPONDENT.

The Belfast City Hall, which was opened by the Lord Lieutenant of Ireland, the Earl of Aberdeen, G.O.M.G., on Wednesday, the 1st inst., occupies the most important position in the city, in the centre of Donegall Square, the grounds surrounding being laid out as a public garden.

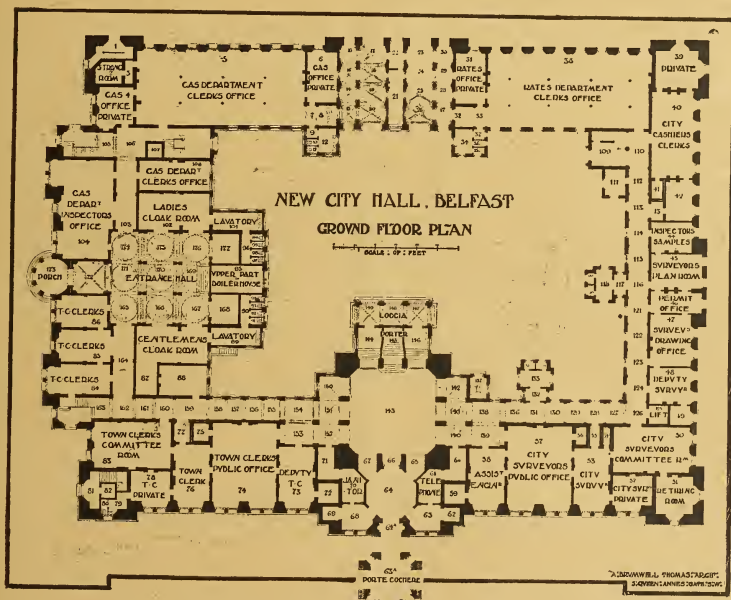
Designed in the style of the Classic Renaissance, the building is quadrangular in form, having a principal façade of 300 feet, and the side façades 230 feet. The height of the building to the parapet is 55 feet, the height of the towers at the four corners of the building being 115 feet, and the height of the principal feature externally is the main dome, which rises to a height of 175 feet.

The grand entrance is a spacious apartment 70 feet long by 40 feet wide, and over 100 feet in height, being crowned by the dome, which is 40 feet in diameter. This dome, which is the most striking feature of the building (both internally and externally), is treated with richly-modelled fibrous plaster; and the view from the entrance hall, on the ground floor, is very fine.

Arms of the City, with the Royal Arms of Edward VII. and the arms of Lord Chichester on either side. Leading out of the Reception Room is the Banqueting Hall, 68 feet long by 38 feet wide, surmounted by a dome rising to a height of 36 feet, the vaults and domed ceiling being enriched with richly-modelled plaster work. The walls are panelled to a height of nine feet in wainscot oak, enriched with carving, and the windows here also are filled with stained glass, showing the Royal Arms, the Arms of Belfast, the Arms of Lord Donegall, and the Arms of Lord Shaftesbury.

In connection with this suite of apartments there is a large refreshment room, and necessary accommodation for the supply of large banquets and civic functions.

The public hall, which has accommodation for about 1,250 persons, is 120 feet long by 60 feet wide, covered with a vaulted ceiling rising to about 40 feet above the floor. The room is lighted with seven stained glass windows, in three of which are shown the portraits of the



The entrance hall, and the great staircase leading out of it, is treated with the most beautiful Greek and Italian marbles, the floor being in black and white squares, with a centre-piece of radiating pattern.

The windows here, as in the other principal apartments, are filled with stained glass, in which the successive stages in the history of the city are portrayed.

The principal suite of rooms comprises the Reception Hall, Banquet Hall, Council Chamber, and Public Hall. In the Council Chamber the seating of the members of the Corporation is arranged on the House of Commons principle, there being a wide gangway down the centre.

At one end is placed the raised dais, with a massive oak green with three beautifully carved and pierced panels, forming a background for the Lord Mayor's chair. The eating here is upholstered in green morocco leather, and tamped with the City Arms in gold. There is a public gallery to seat about 150 persons.

In the suite of apartments in connection with the Council Chamber there is the Reception Room, an apartment 70 feet long by 26 feet wide, spanned by a barrel vault terminating at either end by panelled semi-domes, the whole ceiling being enriched with richly-modelled plaster work. The three windows are filled with stained glass, showing the

Sovereigns that have visited Belfast, viz.—King William the Third, Queen Victoria, and King Edward the Seventh; and in the remaining four, the shields of the Provinces of Ireland. The Hall has a stage for concert performances, immediately behind which are arranged the retiring rooms for performers, with a separate entrance from the street.

The building also provides accommodation for the officials and their staffs of all departments engaged in the work of the city, the ground floor being occupied by the Town Clerk's Department, the City Surveyor's Department, and the City Cashier's Department. The first floor including the City Accountant's, the Medical Officer's, the Electrical Engineer's, and the Gas Department; the second floor being allocated to the Education Works, Markets, and Weights and Measures Departments.

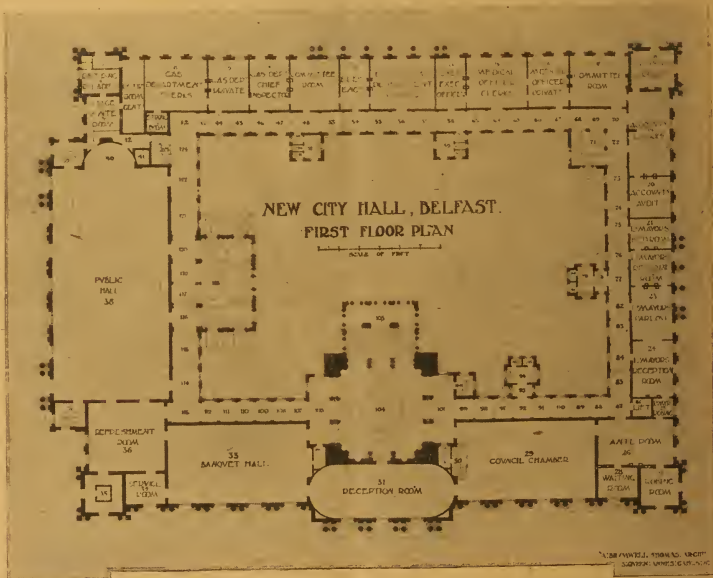
The cost of this great work, including furniture, will be about £300,000, and the architect, Mr. A. Brunwell Thomas, has been engaged ten years in the carrying out of the building.

It may be of interest for our readers to know that the Bath Stone Firms, Ltd., supplied the whole of the stone from the John Pearce Quarries, at Portland, specially selected for this building, and the quantity of stone used was nearly 30,000 tons.



It was not wholly unfitting that the opening ceremony of the New City Hall of Belfast, and its adoption into the life of the community, should take place in a baptism of wind and rain, with which, more than sunlight, we are favoured. Greyiness of day but accented gravity of enterprise. Here is a persistent people, clear of purpose, strengthened by strenuous climate, quickening their step to brightness, when it comes, but nowise moved from their path by gloom. The day—the first of August—was as a period set to a century of history written in that oldest and noblest of forms—architecture. And that they, who, in continuity of the generations, had made the history and given it embodiment, were alive to, and quietly joyed in, the fact, was borne in on the observer threading his way towards the Hall through the gathering streets. No great pageantry there was, no great effusiveness: only interest and a decorous pride. It had been expected that the opening would be performed by the King, but His Majesty's engagements did not permit. The ceremony itself was short and simple. Punctually to the time arranged—11.15 a.m.—their Excellencies the Lord Lieu-

tenant of the City Hall, and deified into the Council Chamber, on the dais of which His Excellency took the Lord Mayor's chair, with the Countess of Aberdeen on his right, and the Lord Mayor on his left hand, the members of the Corporation taking places in their stalls. Rising almost immediately, the Lord Lieutenant, in the briefest of speeches distinct as to sound, but almost incoherent as to manner, declared the City Hall of Belfast open. The one note of impressiveness was contributed by the immediate fanfare of trumpets from the guard of honour without. The Lord Mayor thereupon thanked His Excellency, on behalf of the Corporation and City, for performing the opening ceremony. This, having been acknowledged, was followed by presentation of the members of the Corporation, and so the ceremony proper ended. About 2,000 invitations to the opening had been issued, but barely a hundred of those accepting could be admitted to the Council Chamber. The remainder were seated in the Reception Room, the Banqueting Hall, and the Great Hall, each of which the Viceregal party subsequently visited, and in each of which



tenant of Ireland and the Countess of Aberdeen traversed Donegal Place, the chief thoroughfare of approach to the Hall, accompanied by an escort of the North of Ireland Imperial Yeomanry. At the Hall their Excellencies were received with a Royal salute by a guard of honour, furnished by the Royal Inniskilling Fusiliers. After inspection of the guard, the Viceregal party moved to the portecochère and were met by the Lord Mayor (the Right Hon. Sir Daniel Dixon, Bart., M.P., P.C., D.L.), Aldermen and Councillors, wearing chain and robes of office. The Lord Lieutenant, in morning dress, wore the collar and order of St. Patrick. The Lord Mayor then formally asked His Excellency to open the building, and presented a key of gold for the purpose, bearing in enamel the city arms and a view of the City Hall, with His Excellency's arms and suitable inscription. This key was designed and manufactured by Messrs. Gibson and Co., Ltd., Belfast. The central folding door between vestibule and entrance hall was chosen for the ceremony. Immediately on entry, the Chairman of the Improvement Committee (Councillor M'Cartney), the Architect, Mr. A. Brumwell Thomas, and the Managing Director of the firm of contractors, Mr. John Martin, were presented to His Excellency. Without pause, His Excellency and suite, accompanied by the members and leading officials of the Corporation, mounted

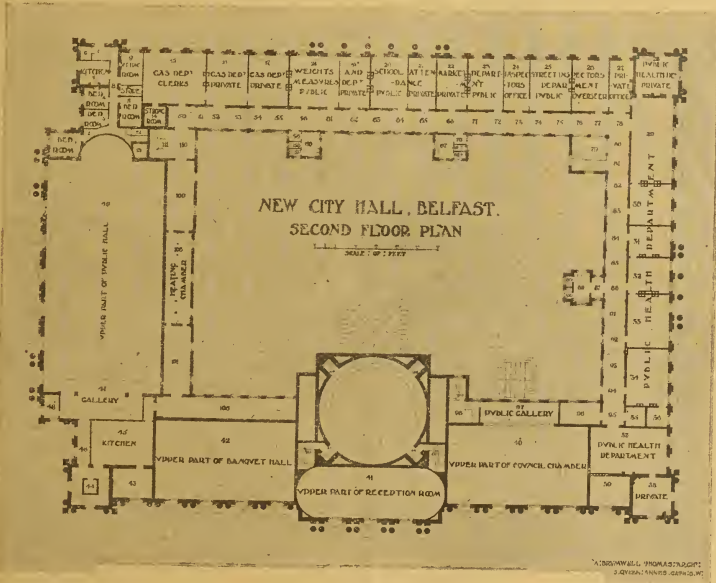
His Excellency made a short speech. In the Great Hall was performed an Ode, specially written and set to music for the occasion. As the strains rose and resounded about the rich magnificence of Corinthian column and entablature, heightened and toned by the brilliant and sombre colours of stained glass, where were gathered all that are most distinguished and representative of Belfast's citizens, one was thrilled with high elation to witness, and just pride to share, such splendid fruition of a great city's growth: and be one, however humble, of those contributing to the life thereof. At 1.30 p.m. the Lord Mayor entertained the Viceregal party, and the local Boards, gentry and citizens, to luncheon in the Banqueting Hall, at which, in their speeches, both His Excellency and the Architect of the City Hall paid a singular compliment to Messrs. Ward and Partners, by special mention of their names and special commendation of the beautiful glass work executed by them. Mr. Ward's work, the architect said, "had two qualities—it was excellent, and it was local; and he felt that the people of Belfast had reason to be proud of it. He would also allude to another feature—the wood carving. As they went through the rooms, particularly the Council Chamber, they would be struck by the excellence of the wood carving, which possessed the same two qualities—it was excellent, and it was local." The

public festivities of the day concluded with a Reception and Ball, given by the Lord Mayor and Lady Mayoress, at which the Viceroyal party were present. The 2,500 people invited had practically the whole City Hall thrown open to them, and the scene was one of the most brilliant that will ever be witnessed there. Always famous for the excellence and profusion of his hospitality, it was an occasion on which even the present Lord Mayor surpassed himself: and the Corporation, as was but fitting, have since marked their sense of this by passing a special resolution of acknowledgment and thanks. The fact that the present is the seventh year during which Sir Daniel Dixon has filled the Mayoral Chair of Belfast, and filled it with dignity and ability, is sufficient proof of his standing in the regard of the city.

So far has been easy to write. But it is impossible to give an adequate idea of the Hall itself within the compass of words. The excellent illustrations, taken from the photographs of Mr. R. Welch, of Belfast, appearing in our present issue, will, however, supply what is lacking. A fully illustrated monograph of the building has been issued by the Corporation at the price of half-a-crown. It

for viewing it were, during the first two days, applied for to the number of 20,000. Its creation heralds the coming of a new era, when the city will recognise that only in art can human consciousness find its supreme expression, and that man cannot live and be long satisfied by trade alone.

Successful as the structure is, however, criticism, with a trace of hostility in it, cannot be altogether absent, though the ease of being wise after the event lends a note of diffidence to one's challenge. First to raise a suggestion of discord is that which, for want of a better word, one can only call the "fussiness" of the grounds surrounding—a confusion of flowers and shrubs and sweeping paths, discounting the richness of the building, where simplicity and rest are needed to contrast it. In a few years the rusticated and severe under storey will be hidden, and the balance of the architectural composition consequently destroyed. This would, to an extent, have been obviated had the chief defect of the structure itself been wanting—namely, the absence of base, and height. As a matter of fact, the base is practically invisible. At the very least, it should have reached the first window-sill level, and been



on sale at the City Hall, or can be obtained from the Messrs. W. and G. Baird, Ltd., Royal Avenue, Belfast, and is very well worth the money. A number of the illustrations in it will, by kind permission of the Corporation, be reproduced in our next issue. But even the best photographs cannot wholly convey the full beauty and impressiveness of the structure, because they are deficient in the spaciousness in which it is set, and by which it is greatly enhanced. From its three hundred feet of height, and almost equal depth, to angle towers and massive dome, rising to a height of 173 feet, it centres and dominates the city—giving this the character and atmosphere it has been so long wanting. Such examples of fine architecture as Belfast previously possessed are lost and circumscribed—hardly anywhere are they efficiently grouped to be arrestive. But, at last, we have a lesson we needed: and it is hardly possible that the city will not gradually transmute the monotonous commercialism of its milieu. In execution its cost, as first proposed, has been practically doubled: not without much public outcry and opposition in the process. But, now that the finished product is visible in all its grace and beauty—for it has eminently both qualities—adverse criticism has died into silence and left only contentment and admiration. The tickets issued to the general public

given greater projection. In this defect lies the only fault to be found externally with the building as a whole. Next objectionable are the two porches. The unity of the chief façade is vehemently ruined by the cupola-ed portecochère, interrupting, as it does, the horizontal sweep, and detracting from the pedimented centre. And little less than an abortion is the setting of the Queen Victoria statue, in itself beautiful. It is too near the building, and should not have been placed centrally. To one side, it could have been balanced by a statue of the King, in whose reign the Hall was completed. Incomparably, the chief entrance and approach to a structure of such character and mass should have been central—carrying on the line of Donegall Place, and signifying, as befits municipality, openness to all: at present to seek. Finally, had the orientation of the building been retained, but the plan turned over, so that west and east sides were transposed, a great improvement would have been effected: for the principal line of traffic is north and west, and the east elevation is, as a two-storied one, more in grouping with the front than the three-storied business likeness of the west.

From the portecochère one enters an octagonal vestibule, and thence, by folding doors of astonishing narrowness, the magnificent hall, 70 feet by 40 feet, rising with splendid



circular sweep to a height of 100 feet, and terminating in an enriched dome 42 feet in diameter. There is not in the Three Kingdoms a grander or more successful architectural effect than here. The ground floor walls of this are of Pavonazzo and Brescia marbles, with black marble plinth; the floor of black and white marble. Facing the entrance rises the grand staircase, in Carrara, Pavonazzo, and Brescia marbles. These are also carried round the principal landing on the first floor, and enriched by a colonnade of Greek Cippolino marble, with white statuary marble caps and bases on a plinth of black marble. From this colonnade spring the four main arches on which the drum of the dome is developed; and above is a whispering gallery and range of peristyle windows, surmounted by an elaborately panelled dome, rich with modelled plaster work, above whose eye rises, on a further colonnade, a secondary miniature dome. From the principal landing on the first floor, and opposite the staircase, opens a semi-circular-terminated Reception Room, 70 feet by 26 feet; one end giving as the Banqueting Hall, and one as the Council Chamber, each 68 feet by 38 feet by 36 feet high. But the chief feature of the first floor is the Great Hall, 120 feet by 57 feet by 40 feet high. Here the beautiful simplicity of the Ionic order, elsewhere prevalent, is departed from, and the Corinthian adopted. It is questionable if the variance is happy. Indeed, it may be said that it is not. The effect is too clamant of notice, too luxuriant. And the unhappiness is increased by the obviously unstructural nature of its appeal. Columns in pairs and entablature in unconnected blocks, resounding woodenly to the knuckles, are false, and strike a jarring note of impermanence. They are all so hollow and veneered and added purely for appearance sake. The remainder of the building is of business character, commodiously and economically planned, beyond which it requires no comment.

So far as quality of material and workmanship is concerned, throughout the whole building, not even the most carping critic could take exception; and the result congratulates more enduringly than any words can, architect, contractors, and clerk of works alike. To the latter, the architect, in responding, before the Lord Lieutenant, to the toast of his health, gave a well-merited tribute of praise and thanks. "He could not," he said, "overlook the name of one who had been associated with the work throughout, the name of Mr. James Gamble. He himself had been at some distance from the work, and during the whole of the time Mr. Gamble had had great responsibilities. A clerk of works should have power and capacity to construct and carry out constructional problems, and he should have integrity, in both of which Mr. Gamble excelled. In the expenditure of the large sum of money involved in the building, they had been well served by him"—a tribute which everyone who has known Mr. Gamble will heartily endorse. To Messrs. H. and J. Martin, Ltd., the general building contractors, also, the architect paid a similar and equally deserved compliment.

Among the work carried out by special contractors, perhaps the most outstanding and brilliant is the stained glass work executed, and almost wholly designed, by Messrs. Ward and Partners. Mr. F. E. Ward, head of the firm, is the heritor of a name long honourable in the service and development of applied art in Ireland, using Irish workmen, and, as far as possible, Irish material. The special compliment paid him by the Viceroy has been already noted. Not only does Mr. Ward aim only at the highest and best possible, and achieve it; he can do so in open competition, both as to quality of design and price, with the best firms of stained glass artists in the Three Kingdoms. His City Hall contract was the largest public order for stained glass paid for by public capital in Ireland ever given to an Irish firm, and was particularly arduous on account of the limited time in which it had to be executed, little over two months being allowed. Being so largely historical and heraldic in character, too, very special abilities of design and executive craftsmanship were required: and the result is a notable success. Brilliant in points, where necessary, the dominant colouring is subdued and restful, though modulated through great variety. Notably successful and life-like are the portraits of King Edward and Queen Alexandra, introduced in the staircase windows. The leading idea throughout the stained glass work is to embody, heraldically and pictorially, the leading historical events and personages in the

rise and progress of the city. Portion of the work was given to Messrs. Campbell Bros., of Belfast, who have done the leading glazing of dome and angle towers in their own excellent manner.

The sculpture in the great pediment of the principal façade of the City Hall was executed by Mr. Pomeroy. It represents Hibernia wearing a mural crown, bearing the torch of knowledge, her right hand resting on the harp, the emblem of her nationality. To her right stands Minerva, attended by Mercury, to whom Industry and Labour are looking for prosperity. To the left is Liberty, awarding the palm branch to Industry, a female figure offering a roll of finished linen; at her feet sits another figure with the Irish spinning wheel. Other industries of the city are typified in figures representing shipbuilding, design, etc. The whole, vigorously executed, is the finest piece of architectural sculpture in the city.

Notable also is the beautiful wood carving throughout the building, on Austrian oak. The pierced screen behind the Lord Mayor's chair in the Council Room being, in particular, brilliantly executed. The wood-carving contract was divided between Messrs. Purdy and Millard, Belfast; Mr. J. E. Winter, Belfast, and Messrs. H. H. Martyn and Co., Ltd., Cheltenham.

The mosaic pavements throughout to halls, corridors, and passages have been executed by Messrs. Diespecker, Ltd., London, the only exclusive mosaic artists in the trade, whose local agent is Mr. F. E. Porter, Queen's Square, Belfast. All the road approaches and courtyard have been laid by the Limmer Asphalt Paving Co., Ltd., of London, and Magheramorne, Co. Antrim, as also much of the roofing to flats in lieu of lead; the local agent being again Mr. F. E. Porter. The extensive and varied sanitary appliances throughout were supplied by Messrs. George Jennings, Ltd., London, of best quality and latest design through their agent, Mr. W. T. Shaw, Donegal Square, W., Belfast; the plumbing contract in connection being carried out by Mr. John Dowling, Belfast. Lifts were supplied and fitted by Messrs. William Coates and Sons, Belfast; and three electric (push button) service lifts by the Medway Safety Lift and Elevator Co., Deptford, London, through their local agent, Mr. W. T. Shaw, as above. Steel window casements, lock furniture, from special designs of the architect, fittings to desks, etc., were provided by Mr. James Gibbons, Wolverhampton, through his local agent, Mr. F. E. Porter. Other special contracts were executed as under:—Heating and ventilation by Messrs. Ashwell and Nesbitt, Ltd., London; marble work, Messrs. Farmer and Brindley, London; constructional steel-work, the Clyde Structural Iron Co., and Messrs. P. and W. M'Leallan, Glasgow; plaster work, Messrs. George Roome and Co., Glasgow; modelling, the Bromsgrove Guild, Manchester (this throughout is beautiful); electrical work, Messrs. William Coates and Sons, Belfast; hydrants, ditto; electrical fittings, Messrs. T. and W. Singer and Sons, Frome; wrought ironwork, Messrs. Francis Ritchie and Sons, Belfast; clocks, Messrs. Gibson and Co., Belfast; strong room doors, Messrs. Milner and Sons, London; hot water service, Messrs. Musgrave and Co., Belfast; wood block flooring, Messrs. Ellis, Geary and Co., London; sales, Messrs. Thomas Skidmore and Sons, Wolverhampton; carpets, blinds, etc., Messrs. Gillespie and Woodside, Belfast; furniture, Messrs. H. and J. Martin, Ltd., Belfast; Maguire and Edwards, Belfast; Goodall, Lambe and Heigley, Ltd., Manchester; Hampton and Sons, London; and Partridge and Cooper, London. The members of the Improvement Committee of the Corporation in charge of erection of the City Hall are:—Councillor William M'Cartney (Chairman), Aldermen Sir Robert Anderson, Hutton, Lawther, and Bell, Councillors Vincent Craig, F.R.I.B.A.; J. J. McDonnell, J.P., M.R.I.A.I.; Shaw, M'Iroy, M'Collogh, Dunlop, Gagehy, Howard, Barkley, and M'Entee. To these, for their arduous and capable services, their clear perception of what was due to the city in worthiness of building, and their carriage of it to a triumphant issue, all honour and congratulation is due. Remains only to add that the total cost is something over £320,000.

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## ENGINEERING NEWS.

**Arklow.**—Mr. Bryce says the Government have promised a free grant of £14,000 towards works at Arklow Harbour, and £7,000 of this amount is provided in the Irish Development Grant estimate of the present year. The Arklow Harbour Board have long since been made aware of the conditions upon which the grant is to be made, viz., that the plans, specifications, and contract which may be decided on by the Harbour Board, acting on the advice of their own engineer, are to be submitted to the Government, by whom they will be referred for examination and approval to the Government advising engineer. When the plans, etc., have been approved the Government will from time to time make payments to the Harbour Board up to the total of £14,000 upon the certificate of the Government engineer as to satisfactory progress of the works. As to the preparation of the plans and specifications the Government can give no advice. That is a question for the Harbour Board and their engineer, and the Government can take no further steps in the matter until the plans and specifications are submitted in adequate detail. Any expense incident to the supply of the plans and specifications will be dealt with as part of the expenses of the scheme and will be payable out of the grant of £14,000.

**Belfast.**—Mr. P. C. Cowan, the Chief Engineering Inspector to the Local Government Board, held an inquiry in the Town Hall into the application of the Belfast Corporation for sanction to a loan of £48,000 for the purpose of carrying out a sewerage scheme for the Sydenham and Knock districts, and the provision of purification work in connection therewith.

**Lurgan.**—The Town Council are prepared to receive tenders for the erection of about five miles of telephone, also water-level recorder and transmitting instrument, in accordance with specification and plans prepared by their consulting engineer, Mr. Henry Harris, 30 Parliament-street, Dublin.

**Millstreet.**—The Council of the Millstreet Rural District will, on Thursday, 19th August, appoint a person to fill the office of engineer to the Council under the Labourers' Acts.

**Sligo.**—The Harbour Commissioners are prepared to receive and consider tenders for a double span galvanised iron roof. Particulars may be obtained on application to the Harbour Engineer, Sligo. Tenders on 16th inst.

**Wicklow.**—A meeting of the Wicklow Harbour Board was held in the Town Hall for the purpose of meeting Mr. Louis Nott, contractor, of Liverpool, whose tender for the foreshore protection works and new groyne, at £26,236 1s. 11d., had been accepted, and signing of the contract.—Mr. L. Nott, the contractor, Mr. Brodie, his superintendent, and Mr. Haydon, manager of works, were in attendance.—After the usual preliminaries had been gone through, the plans and specification were signed by Mr. Nott and five members of the Harbour Board.—Mr. Nott intimated that he would commence the work within a fortnight, and he expected the contract to be completed within 15 months.

## CONTRACTS.

## TO CONTRACTORS.

The Sligo Harbour Commissioners are prepared to receive and consider Tenders for supplying and erecting a double span galvanised iron roof. Particulars may be obtained on application to the "Harbour Engineer, Sligo."

Tenders should be delivered at this office not later than 10.30 a.m. on Thursday, the 16th inst.

The lowest or any Tender not necessarily accepted.

(By order)

THOS. J. MERCER, Secretary.

Harbour Office, Sligo,

2nd August, 1906.

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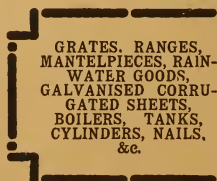
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No. 17—Vol. XLVIII.

HEAD OFFICE

AUGUST 25, 1906.

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## TOPICAL TOUCHES.

Mr. P. Tomlin, sculptor, has secured the contract for a High Altar for Donabate Church. Mr. G. L. O'Connor is the architect.

\* \* \* \*

Messrs. Early & Co., Camden Street, Dublin, have secured the order for the entire lead glazing of Collooney Church, Co. Sligo.

\* \* \* \*

The Carron Iron Company, whose Dublin offices are in Grafton Street, send us a copy of their catalogue of garden seats and rollers, of which they are extensive manufacturers.

\* \* \* \*

Lead is hardly used at all in the United States for gutters, copper, zinc, and tin being employed instead. Steel roofing and metal shingles are extensively adopted for covering the roofs.

\* \* \* \*

Mr. J. Clarke has just completed the scheme of decoration for St. Lawrence O'Toole's Church Dublin. We hear it very well spoken of, and purpose viewing the work at an early date.

\* \* \* \*

It is expected that the year 1907 will prove to be an exceptionally prosperous one in the building trade in the United States. Last year was very satisfactory, but this year will far exceed it, so it is said. What a contrast to the condition of things in the United Kingdom!

\* \* \* \*

In this issue we publish a special description of the recent annual excursion of the Architectural Association of Ireland, which, this year, was to Kettering and district; we also reproduce some sketches by Mr. E. Bradbury, who was mainly instrumental in organising this very successful trip.

\* \* \* \*

Owing to dealing with the excursion in this issue, we postpone the promised additional views of the Belfast Town Hall, which we shall reproduce in our next.

\* \* \* \*

To all who have not already bought a copy of the Studio Year Book of Decorative Art for 1906, we say: "Order a copy at once." The price is 5/-, and it is published at the offices of the Studio in London, Paris, and New York. The number is described as "a guide to the artistic decoration and furnishing of the house." It contains hundreds of really beautiful reproductions of good designs for interior arrangement and decoration of the home—furniture, grates, and mantels, wall-paper and decoration, glass and metal work, and garden craft.

\* \* \* \*

Since our last issue, another awful disaster which, according to some reports, eclipses that of San Francisco, has occurred in Santiago de Chili and Valparaiso. Again, the shock of earthquake, and the effects of fire, have together reduced hundreds of great buildings to ruin and the populace to desolation. The accounts to hand, so far, afford little detailed information as to how the various types of buildings behaved, but, so far as can be gathered, the shocks were of a more violent and long-continued duration than in the case of San Francisco, and few buildings seem to have escaped. Doubtless the work of rebuilding will be begun as soon as the first feeling of terror passes away.

The total fire losses of the United States during the past ten years amount to no less than twelve hundred and fifty million dollars, or nearly eight times as much as the fire losses of the larger European countries, per head of the population.

\* \* \* \*

The Merchants' Warehousing Company, of Dublin, held their seventeenth general meeting on Tuesday last, when it was announced that the building of fifty cottages for their employes was about to be begun as a preliminary to a larger scheme.

\* \* \* \*

Miss Purser, of Dublin, is doing the lead glazing of Spiddal Church. The work is being carried out in very beautiful Irish "bottle glass," made at Ringsend, and is being worked with extra heavy leads. The whole has a most satisfactory effect.

\* \* \* \*

A very remarkable book by Mr. Robert Elliott, who has occasionally contributed letters to our columns, has lately been published by Sealy, Fryers and Walker, and is a remarkable indictment of Irish architects, and of all who have to do with art in this country. Elsewhere we review the book.

\* \* \* \*

The Ulster Society of Architects has, somewhat suddenly, without notice to the Institute, and, we believe, without the knowledge of some of its members, severed its connection with the Royal Institute of Architects of Ireland. No reason is, so far as we are aware, assigned for this step. Elsewhere we deal with the matter in greater detail.

\* \* \* \*

A correspondent of *The Master Builders' Journal* calls attention to the value of sawdust as a fuel for steam engines. An experiment was made, and it was found that where five tons of coal per week had formerly been used, one ton, together with 120 sacks of sawdust, now sufficed. The sawdust keeps up the steam as well as the coal, and, strange to say, preserves the tubes much cleaner. The fire is thus arranged: "In the morning the stoker starts a thin fire of coal, then when it is red we bank on our dust, leaving clear parts burning at the end and sides. These parts seem to consume the smoke." In the particular case instanced the saving is said to have amounted to £2 per week.

\* \* \* \*

A machine, of interest to builders, which we do not remember to have ever seen in operation in these countries, is in use in the United States; it is known as a floor-scraper, and is used for cleaning and traversing off wood floors. A man will scrape by hand about two squares of flooring in eight hours, while the same man, with a "floor-scraper," will clean off eight squares in the same time. It is claimed that these scrapers are suitable for every variety of wood floor, and will go into the corners and close along the skirting. In appearance the scraper works like a lawn mower, and, under the American wage standard, a saving of from one and a quarter to one and three-quarter dollars per square is effected. Thus in fifty squares there is a saving of from sixty to eighty dollars. A dozen knives are furnished with the machine, and they will scrape about 300 squares. New knives cost about 25s. per dozen. The price complete of the machine is 65 dollars, and the makers are the Hurley Machine Company, 153-9 South Jefferson Street, Chicago. The invention seems worthy the attention of Irish contractors.



## AMERICAN METHODS OF ERECTING BUILDINGS.\*

By R. A. DENELL,

*Managing Director of Waring White Building Co., Ltd.*

The receipt of a letter from your Secretary asking me to read a paper on "American Methods of Erecting Buildings" before the Institute gave me extreme pleasure, and yet, at the same time, anxiety—pleasure because I certainly deemed it a great honour, and anxiety as to whether I should be able to write a paper which would be interesting enough to take up the valuable time of the members of this world-renowned body.

I presume that by "American methods" is meant the methods of the United States, or, as Sir Edward Clarke K.C., has so aptly put it, U.S.O.N.A.; for, although Canadian are practically the same as American methods, this cannot be said for Mexico or the different States in Central and South America.

I must say I often get tired of hearing of American methods, and especially to be expected to sustain their reputation for strenuousness; for wherein can they be said to be different from English methods if we omit the so-called sky-scraper, a building which is practically the result of the evolution of modern business? Hotels, stores, etc., can be, and are, analogous to office buildings in construction; but as regards domestic, public, church and factory work, etc., there is really no great difference except that of details—a difference which applies equally to all countries, and less so between England and America than others.

The principles of architecture and the materials of construction are much the same to-day as they were in the past, and we can therefore hardly expect startling changes. Whatever differences there are, result from the evolutionary change of living, which the modern architect and builder alike have to meet, just as formerly. In olden times the architect was artist, engineer, and craftsman, in fact everything except the client, who was generally the Church or the Government; and in those days thirty years in which to complete a work was considered quite fast enough. Nowadays the client in most cases desires to give the commission to the architect to-day, and to have the work completed next week, so that he may enjoy the revenue during his own lifetime rather than leave the enjoyment of it to posterity.

The title of this paper may be considered to apply broadly dominant factors in the consideration of the present subject.

Increase of rapidity may be considered to apply broadly to constructive methods, or more narrowly to the management of a contractor's business. If I took the latter view I should have practically nothing to say. American contractors are generally good business men, and apply business principles to their affairs. They try to make every man in their employ responsible in his own position or sphere, advancing him when he shows capabilities to trust his own judgment, and go ahead alone successfully. In this they are no different, of course, from large contractors the world over. The best builders in America, as a general rule, have served a large portion of their apprenticeship in architects' offices, and this has resulted in a better understanding of the architects' ideals and demands, thus enabling them to assist rather than hamper.

Labour to the contractor is of primary importance. Much has been written about the British workingman, but I must say that I do not agree with the writers of the articles I have read. They all attack the bricklayer. Now, gentlemen, I think the English bricklayer does better work than his fellow in any other country. As regards the amount of work done, I have had men in this country who laid an equal and in many cases larger number of bricks per day, under similar conditions, than I have had in America. Continental brickwork does not compare with work here. I consider, too, both the English stonemason and the navy splendid workmen.

When it is remembered that the wages of building mechanics in America range from 1s. 10½d. to 2s. 11d. per hour for an eight hour day, while the labourer gets from 1s. to 1s. 6d. per hour, you feel that one ought always to get good men; but unfortunately you do not. The main difference, then, I consider is that here we get careless of our labour by reason of its cheapness. If it were more expensive we should watch over it more and give it better supervision. I believe it is a rule among the best American contractors never to allow more than twenty-five men to work without a foreman, the result being that he sees that they work, and, what is more important, that the work is planned out for them in advance, and that their materials will be ready as wanted. I mention this last particularly

because I have noticed so often that a man will waste hours waiting for materials, and also is disposed to put his hands in his pockets and contemplate what there is to do next, and how he shall do it, when, in my opinion, this ought not to be his to do, but he should simply be required to do his work as instructed quickly and well.

One of the chief reasons for the rapidity of construction in large buildings in America is, I believe, the way with which materials are dealt. Contractors in America do not have their own shops. Yards for the storage of plant, etc., of course they must have. Time being an essential factor, it would be impossible for a contractor there to execute joinery, stonework, marble-work, and ornamental plastering so efficiently or so well with his own plant and in his own shops as each man in his own particular trade who has made it a speciality and has had life-long experience in it. Steel, terra-cotta, partitions, and mechanical plant are manufactured by much larger firms than here, and can therefore be supplied much more quickly. The builder stands, however, between the architect and the specialists, seeing that the material is correct in quality and workmanship, and that it is being worked carefully to details, and also that it is being advanced so as to be ready at the proper time to fit in with the other work.

There are certain slight differences as regards plant—cranes, scaffolding, and hoists. With the exception of those used in "sky-scraper" construction, the cranes in this country are as practical as those used in America; while as to hoists, when cranes are used there should be very little difference as regards efficiency between them and hoists. When, however, the handling of materials is performed by means of baskets, hods, etc., I consider it childish (except of course under special conditions).

But coming to the larger aspect of the subject, the difference in the methods of construction in American practice is the result of evolution in response to certain conditions, climatic and economic, and also in response to public demand.

I do not propose to deal with the erection of domestic buildings and other small work in provincial towns and villages, because the construction and method of erection are virtually the same as in this country, the contractors being small men, or separate tradesmen being employed.

Disregarding public work, which is somewhat an exception, and dealt with in much the same way as here, the client of the American architect may be stated to be either a successful practical man who has arrived at his position by his own efforts, or, as is very seldom the case (especially outside the Eastern cities), a man of inherited wealth. Therefore, as the predominating client is practical and commercial, his demands are those that result in the greatest financial benefit to himself, such as speed, economy in construction, greatest available space to let, etc.

The remuneration of American architects is the same as here; but for this much more work is required, more detail drawings having to be furnished, and no assistance being afforded from clerks of works or quantity surveyors; while the foremost architects, in order to succeed, have to keep a large and competent staff of engineers. The result of this is that the successful architect's time is taken up in business matters and in criticising the work of his designing staff, leaving him no time to use the pencil himself, the only exception to this being in the case of a partnership where the work is allocated to the various members of the firm.

It may be mentioned that in America the quantity surveyor is unknown. The time given builders in which to estimate is rarely more than a fortnight from the time the plans and specifications are furnished to them, and each builder keeps his own staff of estimators, as they are called, who take off the quantities from the architect's plans and specifications. This results in a saving of time.

As regards the clerk of works, American practice is essentially the same as English, only the architect's representative is called "superintendent." He is paid by the architect and works under his instructions.

If consulting mechanical, sanitary, and structural steel engineers are required, they are generally employed by the architect; and to avoid the expense of this is the main reason why so many architects have these engineers on their office staff. I might point out that this would only be remunerative when a large amount of work was done annually. This in the cases of men who deal with the largest work amounts to from one to four millions sterling per annum, and in the latter cases an architect's establishment costs would be about £50,000 a year. With this staff an architect can from the beginning furnish a contractor with full information, both scale and detail drawings; and I must say that this is one of the most necessary things for a builder or an architect who desires speed in construction. This, I am sure, is a primary essential to speed, allowing the builder immediately on signing the conditions of contract to arrange for his

\* Read before the Royal Institute of British Architects.

steel and other materials to be manufactured in advance, and assembled elsewhere than on the site.

The largest builders have a competent staff of mechanical, sanitary, and structural steel engineers, who draw up their own plans and specifications, of course working in harmony with the architect, and submit their tenders for these branches of work from their own plans, thus saving the architect from all this increased establishment expenditure and attendant worries. In such cases the contractor guarantees the work as to quality and efficiency. With the engineering staff in his own employ, a builder can subdivide the engineering work, so that he can buy the parts from the best makers and then assemble them—which works out cheaper as it saves the intermediate profits.

As nearly all the largest buildings have their own mechanical plant which heats, lights, furnishes power for lifts, pumping water, etc., it can readily be seen that if the architect does it all efficiently he must neglect the plan and designing of the building, unless, as before mentioned, he has a special trained staff of engineers to do this work for him, which is only done in a few of the largest architects' offices.

The Building Laws here undoubtedly restrain the contractor and architect as to speed. Different surveyors have also to be dealt with, whereas in America each city has its own building department, which is the only authority to be consulted. This means that before starting work plans must be filed and approved, after which, except for variations, etc., one can proceed without further interference when following plans which have been filed. The larger cities now have a competent staff to deal with building works; and an engineering staff to calculate the strength of the various parts from the drawings, so as to see that they conform to the By-laws, and are structurally safe, thus preventing "jerry"-building, etc.

Again, each city has its land surveyors, who at once, upon notification, fix according to law, and to deed and title, the exact boundaries of your client's property. Thus, the architect, immediately upon starting his work, obtains exact dimensions for his plans, so that the builder has these fixed dimensions to work to, and from which to order materials in advance. It will be appreciated what a great advantage this is to the builder, as he then has no hesitation in ordering his materials ahead, so that he may have them ready when needed. You will notice how all American working drawings have figured dimensions, these not being left to be scaled, as is generally the case in this country. I might say here that one of the best builders in America once told me that erecting a building was nothing but putting an experienced and energetic man in charge and seeing that he was furnished with materials to work with, without any worry or trouble upon his part. I would also point out that with the small cubical contents of buildings allowed by the Acts, it is impossible to store or stack materials on the work as in America; and this compels English builders to live more or less from hand to mouth, relying on their carters or their own teams for supplies. I have found this to be the cause of very frequent stoppages and delays.

As to American materials allow me to give you a hasty comparison, explaining wherein they are different from those used here.

A small brick is used, measuring on the average about  $8\frac{1}{4}$  inches by  $4\frac{3}{8}$  inches by  $2\frac{3}{8}$  inches, except glazed bricks, for which the English size is generally used. There are no other essential differences in bricks except the natural ones in clays, due to the different localities, a greater range of colour and texture being found in facing bricks, which gives architects much greater scope for colour schemes. Facing bricks of a great many special sizes are also used, such as the "Norman," which is a brick measuring 12 inches by  $4\frac{1}{2}$  inches, or the "Roman," which measures 12 inches by  $4\frac{1}{2}$  inches by  $1\frac{1}{2}$  inch. In America the bricks are laid in all manner of bonds, such as English, Flemish, no-bond, etc. For this last reason English brickwork is superior structurally to American.

The United States at the present time manufactures practically all its own cement, and it is very good, though not, as a whole, equal to English Portland.

Lime is very much the same, except that on the average it is whiter in the United States than here.

Timber, of course, is much more extensively used. It is sold by board measure, namely, so much per thousand feet of 1 inch by 12 inches by 12 inches. It is much cheaper, and this is the reason so many wooden houses are erected, and why so much "mill construction," or what is called slow burning construction, is adopted. The principle of this latter is to use large timbers throughout, i.e., heavy joists measuring at least 3 inches by 12 inches, and stanchions or pillars at least 12 inches by 12 inches; while all flooring is 3 inches thick or more, so that in case of fire the timbers will char for a long time before breaking. This

system of construction is recognised by insurance companies as second only to the fire-resisting construction, and when a sprinkler system is installed is considered, in the majority of cases, equally as good.

In stones there is a greater variety, both in quality and colour. The favourite, as here, is a white limestone, which comes from the State of Indiana, and is almost identical with Portland, except that it has no shells in its structure. The American dark granites—blue, black, and red—are not as fine as Scottish granites, but in white and grey granites there is a much greater variety. Local marbles have a greater range than English and Irish, and are superior to many Belgian and French marbles, though not so beautiful as the Grecian. All the finest Government work is in granite or marble. The cost of stonework in the States averages about the same as here, and granite is a little cheaper. The stone there is finely worked, and the surface is generally tooled. This is called drove work, and is done by machinery: it consists of about eight cuts i.e., fine channels, to the inch, and has the effect of making the work look very true and straight, as the surface does not reflect light in the way that a smooth or polished surface does, such as, for example, sheet of window glass.

Terra-cotta in my opinion has reached a higher usefulness in America than here, the reasons for this being, first, the greater variety of clays, which gives the opportunity of furnishing almost any colour or shade an architect may desire for polychromatic effect; and secondly, that terra-cotta is particularly suited for an external covering to a steel skeleton frame. I believe America is also in advance in its manufacture, as the terra-cotta is straighter, truer, and, what is of still greater importance to the architect, produced in much larger blocks than here, thus more nearly approaching stone in effect. A great deal of glazed terra-cotta or faience, or what is called in England "Carrara-ware" is used in America, as clients call commercially for buildings easily kept clean and bright in smoky and dirty cities—and practically all the larger cities in the Middle West come within this category.

Metals are practically the same as in this country. I will deal with steel construction later. I would, however, call attention to their so-called ornamental iron and bronze work. This is very extensively used, principally resulting from its demand in fire-resisting buildings, and includes a much greater variety of cast work than here, all staircases, etc., being built of ornamental cast-iron.

There is very little concrete stair work in the States, cast iron being used in fire-resisting buildings on account of the lightness of construction. The cast-iron staircases have iron stringers and risers, with marble treads. In buildings where several stories are exactly alike one pattern only is needed, and the cast-iron stringers can be attached directly to the steel frame of the building. In buildings not fire-resisting cast-iron stair work is replaced by wood. It would, in my opinion, be better in American practice, especially as regards fire-resistance, to follow English practice by using concrete staircases in all non-fire-resisting buildings, and also as regards the system of concrete lintels in use here, but not there.

As regards floor construction and partitions nearly all buildings not exceeding eight stories in height are not fire-resisting, which I am glad to see is not the case here. In such buildings the floors and partitions are nearly all of timber construction. For buildings over eight stories in height the prevailing system of floor construction is either hollow terra-cotta blocks built in arch form, with either flat or segmental soffits as an architect may desire, or some form of reinforced concrete. A hollow-floor construction is a great advantage, as it is lighter, thus materially saving in the amount of steel required in a building. I would here remark that if architects would allow greater depth for floors considerable saving in weight of steel could be effected. A hollow floor can be designed with a total weight of all steel in it of 6 lb. per square foot, whereas the solid construction requires on an average about 15 lb. per square foot. The double floor has also other advantages, such as soundproofness and increased rigidity, thus militating against vibration and deflection. The solid concrete floor with light joists placed closely together is never used in America. Partitions in these buildings are of hollow terra-cotta blocks, expanded metal, or "Mack." Breeze building blocks are not yet used. In New York all buildings over twelve stories in height must not only have all floors and partitions of fire-resisting material, but if woodwork is used it must be treated, whatever its kind, by a fire-resisting process. All exterior window frames and sashes must be of metal with fire-resisting glazing.

As for foundations—their design, of course, depends upon the locality, i.e., the soil. Where the soil is of a ballast nature the foundations are generally of the grillage type—steel joists and concrete. In New York, which practically stands on rock, although in some cases at a considerable



depth, concrete piers are used, these in the deepest cases being sunk by means of pneumatic caissons. In Chicago, where the problem has been most difficult, the methods of constructing foundations have developed along with the progress in steel-frame construction; that is to say, piers of granite, stone, or brick, gradually spreading until of the necessary area, were first adopted. Then the floating foundation was tried: this is simply steel grillage and concrete, each pier being entirely separate and calculated to sustain a maximum load of 3,750 lb. per square foot. This did not prove perfectly satisfactory, as, owing to the compression of the soft clay, considerable settlement took place. Then wooden piles were tried; but it is thought a stable foundation for a high building has been found at last for this soil. It was discovered by boring for wells that there was rock about 100 feet down. What are virtually concrete piers 100 feet deep, and from 5 feet to 7 feet 6 inches in diameter, are therefore being constructed, and the bases of the steel stanchions put on these piers, the weight thus practically being sustained by the rock. The method of constructing these has been so improved that they work out at an average cost of about £200 each. One interesting development in regard to foundations in America, and one of the novelties that have there arisen, is the cantilever foundation. Party-walls are not customary in the larger buildings, and the cantilever foundation has been devised to meet the need of supporting adjoining walls on their respective curtilages, without the expense of underpinning and guarding against disturbance that arises when spreading foundations which enter upon neighbouring land are used. Cantilever foundations are mostly found in the sky-scrapers of New York.

Plumbing and drainage in the United States are essentially different from here, as the by-laws do not require all soil pipes, etc., to be carried down externally. As a matter of fact this is the exception. Rain-water pipes are occasionally carried down outside. But most of these are taken down inside. The rising mains, soil pipes, etc., are nearly all carried down next to the stanchions, and are so arranged with traps and plugs that they can be readily got at on the different floor levels. Most of the drains, as well as the soil pipes, are of cast-iron, water pipes occasionally being of lead, though in most cases they are galvanised iron. The explanation of this sanitary practice is that the climate does not allow plumbing to be carried down outside on account of frost: even in outside walls it is dangerous in this respect.

I would like to call your particular attention to the large amount of cast-iron work used in the States in the framework of building up to twelve stories in height. Cast-iron, I believe, could be used to great advantage here for stanchions, as it is a material immediately available, cheap, and always able to be manufactured close to where the work is being done. It is also a material that can be delivered and erected quickly.

You might like to hear a comparison of cost between buildings in this country and in America. I have made quite a number of comparisons, and can quite safely say that, taking a building as a whole, the cost here would be about the same as in Chicago or any of the Middle or Western cities, which would average about 10 per cent. cheaper than New York City. The explanation is that the difference in the cost of labour is counterbalanced by cheapness of materials.

Now let us consider the so-called "sky-scraper." This type of building has more or less revolutionised building practice. It is simply a commercial evolution of a building. Site values had reached such a height that owners began to raise their building heavenward. The heavy rates of all large cities also demanded this. The result was that in a short time property owners were faced with the position that their old buildings, or even new buildings of the old type, would not pay an adequate return on money invested; and, moreover, that the newer buildings with their modern conveniences, such as lifts, telephones, telegraph, heat, electric light, plenty of light and air, etc., and much finer interior fitment, drew away tenants even at increased rentals. The basement and ground floors of this class of building bring in sufficient rental to pay all interest on the freehold or ground lease: the first floor covers all rates and depreciation; the next few stories—their number, of course, depending upon the cost of the building—bring in the interest on money invested to build and all maintenance expenses; the balance is profit; and all offices being occupied, this generally gives good returns.

In America nearly all property is freehold, except in the central or business districts of the larger cities, where there is a great deal of leasehold property. In connection with this I would point out a principle which I believe, apart from the loss of interest on money invested, has more than anything else caused the American builder to obtain such speed in the erection of this class of structure; that is, that nearly all leases of property (not ground leases) expire on the first day of May each year, leases running from year to year.

The result is that if a building be not ready for tenancy then—it will have to stand practically empty until the following year. This also demands that tenants shall look for new quarters well in advance of 1st May, and the result in many cases is that before a building is a few stories high it is rented for occupancy the following May. Its completion then becomes a necessity, no matter what the cost, otherwise there would be heavy damages for breach of agreement and also loss of rental.

Property in New York and Chicago in the choicest locations realises as much as £85 to £35 per square foot, and office rentals range from 5s. to 17s. per square foot, which includes all rates, heating, etc. As a rule above the first floor rents increase as one goes up, the top being the best, as it is quiet and has plenty of light and air. By means of perfect systems of lifts, running express service, no time is wasted in reaching the top floors.

Now and again tales are heard of forty-story buildings. I believe while these could be structurally and safely built, especially if the base were large enough, that the practical commercial building will not be higher than twenty stories, and that will soon be the limit. The cost of maintenance above twenty stories and the great loss of space on the first twenty stories occupied by lifts, etc., to reach the upper stories, as well as the increased cost of construction, will not be counterbalanced by the amount of rentable space gained.

I would call your attention to one of the early buildings in Chicago. This building was erected for some capitalists in Boston (conservative Boston) who, while having faith in the future of Chicago and their capability of letting a sixteen-story building and making it pay a return on the investment, did not deem it wise to build with a steel frame, rather desiring to allow others to experiment first. (What progress would the world make if this principle were followed by all of us?) This building has all its external walls and piers of brick, no steel being employed, each pier being most carefully calculated for its minimum size, using the very best materials known for bearing great weight.

As regards the life of these steel-frame buildings, when built on proper and now well-known lines their life is as long as that of other buildings. In fact I believe that modern conditions of life are changing faster than buildings depreciate, thus necessitating rebuilding before their life is run. The steel is all buried in concrete, all exterior stanchions being enclosed in brickwork, and the interstices grouted full of cement mortar. The interior stanchions are treated in the same way, bricks or fireclay being used for covering. In addition the stanchions themselves are now being filled internally, while being erected, with concrete, and it is a well-known fact that the inclosing of steel in cement concrete, thus excluding the air, prevents all corrosion.

As to a comparison in cost between buildings supported on steel stanchions and by ordinary brick walls or piers, the cost of carrying a load on a steel stanchion is about one-third that of carrying the same load on a brick pier, providing the load is over sixty tons. This can be arrived at by finding the cost of carrying one ton one foot high by the two methods. For the basis of calculation we will assume that the cost of one cubic foot of brickwork is 1s., and that the carrying capacity is six tons per square foot; the cost for carrying one ton one foot high is therefore 12.6d.—2d. If the cost of a steel stanchion framed complete is £10 per ton, the cost of 1 lb. of metal is about 1d. The cost of one cubic inch of metal is therefore about one-third of a penny. Assuming that the carrying capacity of an economical section of a steel stanchion is 5½ tons per square inch, the cost of carrying one ton one foot high is about two-thirds of a penny. As before stated, the cost of carrying one ton one foot high on brickwork is 2d. Therefore by using steel stanchions the cost is reduced to one-third of that amount. The above calculations are made without taking into consideration the brickwork wasted in walls which are not loaded to their full capacity, whereas steel can easily be designed to the required section. On the other hand, nothing is allowed for the brick walls which would be necessary according to the building by-laws, the case we have been considering being one where such walls would not be required by the by-laws.

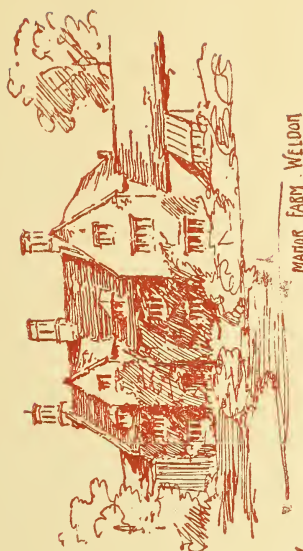
There is also a saving of floor space with steel construction. From the foregoing calculation it becomes apparent that the area of a steel stanchion to carry 60 tons can easily be made 1.46 square foot finished and enclosed, as the sectional area of a brick pier to carry the same load would be 10 square feet. The economised space per foot worked out for all floors at its proper rental value would soon mean a substantial sum which would be well worth considering from the investor's point of view.

Another advantage in favour of the steel frame might be mentioned, namely, its adaptability to the construction of architectural features, as projections outside the main building lines can easily be carried on brackets or cantilevers with little cost and without interfering with the main steel

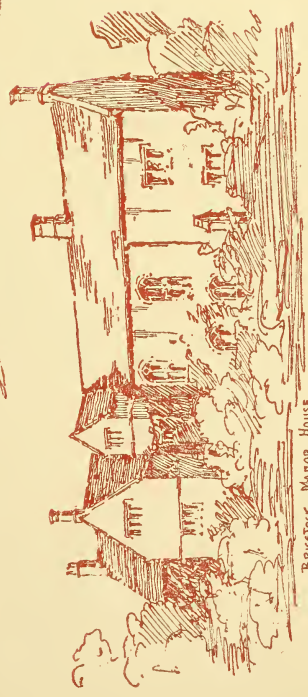


BURTON KATIMER SCHOOL

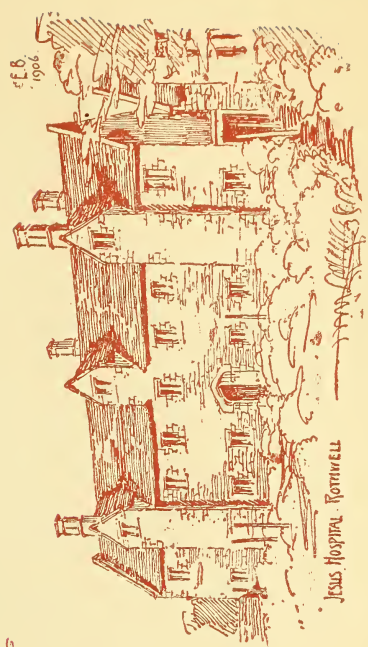
WENLEY ADAMS' house



MAJOR FARM WELDON



BURTON KATIMER house



JOHN HOSPER, ROTTWELL

Feb. 1906

A-A1. EXCLUSION - NORTHAMPTONSHIRE - 1906.



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frame. The advantages, too, in the way of planning are great, for walls can be taken out and large areas gained wherever desired.

In regard to the steel frame or the so-called skeleton itself, I will not enter into an exhaustive description. In itself it would make an interesting evening. I wish, however, to call your attention to a few points. The stanchions of these buildings generally break joint; that is, they are jointed on every other floor, so as to give a stiff frame. It is also good practice to build the outside girders carrying the walls of plates and angles, making them two feet or more in depth, this method generally requiring no greater weight of steel than the usual channels and joists, while certainly adding greatly to the stiffness and rigidity of the frame. The gusset plates here should also be noted: these are provided with the same object of giving stiffness to the frame against wind strain. In buildings of ten to twenty stories the steel frame is an absolute necessity for stiff and sound construction as well as for the commercial value of the space gained and the rapidity with which this class of structure can be built. One might say it is built in the shop, and that it is only a question of assembling when it reaches the site; dimensions also being necessarily fixed, all interior fitment can be started at once, and when the building is ready can be accurately and quickly put into position. Thus the building's advancement does not entirely depend upon weather or even daylight, as work can be carried forward in the various shops and well in advance. Not only that but the steel frame can be pushed ahead and the inclosing shell can follow at any floor, working, if necessary, on several stories at the same time, and starting interior work long before the exterior carcass is completed.

I would like to draw attention to the use of terra-cotta and the possibilities in this direction when a steel frame is used, as terra-cotta can be attached to this steelwork better than any other material, is more fire-resisting than stone and granite, and allows an ornamental design to be built cheaply. The ornamentation is simply a question of the models which can be used over and over again. Terra-cotta also aids rapidity of construction.

A great many persons feel that rapidity in construction means poor work: this view I strongly oppose. It is possible that such a limit could be reached, and is perhaps sometimes; but the general statement that fast work means poor work is untrue. For instance, it could not be called "rushing the work" to have a sufficiency of materials, etc., ready to enable a number of men to be engaged all over a large building, doing their work properly, rather than a few men working in one section only and allowing the other sections to stand idle until they were through.

I am aware that there is a good deal of doubt among architects here as to the æsthetic legitimacy of steelwork, as there was in the United States at one time, although the opposition is much weaker now. It seems to me that steelwork is not outside the pale of the art of architecture. I have endeavoured to show that there are logical reasons for the adoption of steel frames in buildings; and if there is reason, then surely steel cannot be inartistic, any more than timber. There is a question, of course, of the legitimate clothing for the skeleton as to how far this should be expressed; but there is nothing against the framework itself, no more than the skeleton in our bodies. The analogy might be carried further and the floor construction referred to as the muscles and cartilages, the walls, etc., as the flesh, and the hair, colour, etc., being the various materials used by the architect to give beauty of detail.

Allow me, gentlemen, in conclusion to say that I think there are a great many things America can learn from England, an older country with much experience. On the other hand, there are things Englishmen can learn from Americans, who have gone ahead with energy, making mistakes, realising them, and beginning afresh again, as all youth does and will when it has the proper grit. The demands of modern life are different, and so are its needs, and we shall not be allowed, even if we should so choose, to stay where our fathers did. Your clients demand, as I have said, rapid and good construction, modern planning, artistic designing, and in fact everything that will render their work successful artistically, commercially, and constructionally, and, what is more, they want it at once.

I would add finally that your best friend is the builder, as you are his. You should work together. He must have plans, details, and instructions complete and definite at the earliest moment in order to accomplish the desired results. Give him full control and make him alone responsible. If you deal with one person for a portion of the work and with another for something else, you not only relieve the builder of a portion of that responsibility, but you actually hamper his progress, for then the other person looks to you and not to him.

#### OUR SOUTHERN LETTER. (FROM OUR CORRESPONDENT).

##### Railways.

His Excellency the Lord Lieutenant has opened the new route from Cork to London *via* Fishguard and Rosslare. The new railway from Rosslare to Waterford forms a junction with the Waterford and Limerick branch of the Great Southern and Western Railway, and crosses the River Barrow on a bridge, 2,131 feet long, formed of 13 spans, one span opening. A junction is also formed with the Wexford and Rosslare line. A connection is also formed between the line on the south side of the Suir with the lines on the north side, by means of a bridge over 1,200 feet in length, formed of eight spans, and one opening span of a bascule type on the Scherzer rolling system, giving fifty feet clear waterway.

The contractors for the railway were Messrs. Robert McAlpine and Son, and for the Barrow and Suir bridges Sir William Arrol and Co., of Glasgow.

Extensive works have also been carried out at Rosslare Harbour. The contract was carried out by Messrs. Brand and Son, of Glasgow.

This extensive work has been promoted jointly by the Great Southern and Western Railway and the Great Western Railway, the latter company having extended their system to Fishguard and formed a harbour there.

By means of this route it will be possible to reach London 13 hours after leaving Cork, that is, leaving Cork, at 7.30 p.m. arriving in London 8.30 a.m. next morning.

The promoters of the Cork Link Railways Bill have applied for the return of the £10,000 which was lodged as security in accordance with Standing Orders.

The Cork Harbour Commissioners have sealed the agreement between them and the Great Western Railway Company of England with respect to the subscription of £10,000 to the Cork City Railways Company, guaranteed by the Harbour Board.

##### General.

In connection with the drainage of the Lough district of Cork, an interesting point has arisen. The Rural District Council have applied to be allowed to drain this district into the city sewers and thence into the river. The Law Agent for the Corporation has stated that the position with regard to owners of property and the District Council with regard to this project was the same as the position that Morrogh Bros., O'Brien Bros., and the Rural District Council were in with regard to the Douglas sewerage scheme, and if the Lough scheme, as now proposed, was carried out, the owners of the property, the District Council, and the Corporation would be liable to be restrained by injunction.

Although the Corporation, by Act of Parliament, had the power to convey the city sewage into the river, there was no such power on the part of the District Council, and there was no power on the part of the Corporation to give them permission to do so. There was a duty cast on the District Council of providing proper means of sewage disposal for their district, and this duty was clearly shown in the Douglas case.

A similar matter was dealt with by the Cork Harbour Board in connection with the outfall into the river from the proposed sewers at Ballintemple and Victoria road.

The Rural District Council wished to be excused from constructing sediment tanks, at a cost of £600, but the Board insisted that the Council should construct proper clarifying tanks.

In connection with the above matters, plans and estimates have been prepared by Messrs. W. H. Hill, jun., and D. J. Coakley, civil engineers:—

Lough sewerage scheme, including septic tanks and filter beds, total estimated cost £5,188.

Ballintemple and Victoria road scheme, including clarifying tanks, total estimated cost £1,526.

The Cork Corporation received nine tenders for the building of a new concert hall and executing sundry alterations in the School of Music, and the lowest—£600—was accepted. The highest tender was about £1,000.

Mr. Andrew Carnegie has presented £3,000 to the Lismore Rural District for the erection of four branch library buildings. The Council have decided to expend the sum as follows:—Lismore, £2,400; Cappoquin, Tallow, and Ballyduff each £200. The Cappoquin and the Tallow people are puzzled at the division made by the Council, as they consider the four branches should each get one-fourth of the gift.

#### THE IVEAGH MARKETS.

In our report of the transfer of the Iveagh Markets the name of the clerk of works should have been given as Mr. Lewis Moore.



## CORRESPONDENCE.

## THE BUILDING TRADE CONFERENCE, DUBLIN, 1906.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

DEAR SIR,—In your report of 'above Conference, it is noticeable that the only discordant note struck was in the remarks made by Mr. John Good, and that these had not been led up to by any previous speaker; the Lord Mayor had spoken only in general terms as to the desirability of

visitors least of all; and, indeed, nothing could have been in worse taste than his reference to the alleged assistance received from their Federation, in sending "thousands of men to enable them to carry their ends in the dispute"—a sentiment, by the way, neither happily conceived nor expressed, and that now, with our fuller knowledge, sounds even foolish, seeing we have known for some time that it was during this lock-out that the contract for the coming Exhibition was given to a stranger.

Mr. Good, in returning thanks for the assistance received, forgot to include amongst his blessings Messrs. Humphreys and all his following; but it is just here the retributive justice comes in.

The imported men did not stay long, but left, as a memento of their visit, some curious examples of the brick-layer's art. It is a pity so many of these had to be pulled down; but they were not altogether useless, for they gave our own men many a hearty laugh.—I am, sir, yours truly,

Rathmines, August 18, 1906.

L. MOORE.

THE BELFAST TOWN HALL.



The Lord Mayor's Screen.

We reproduce two photos of the oak carving of the Lord Mayor's screen in the new Town Hall, which has been executed by Messrs. Purdy and Millard, who did the entire oak carving work in the building. The raised centre panel, shown above, is 6 feet 8 inches high by 2 feet 3 inches, and is carved and pierced on both sides, as also are the side panels.

a good understanding existing between employers and men, and his words were marked throughout by a moderation and good taste which it would have been well if Mr. Good had copied.

But, true to the reputation he has earned as the stormy petrel of the building trade, he must needs drag in some unwelcome topic; no one thanked him for doing so, his

Messrs. George Jennings, Ltd., hydraulic engineers, of Lambeth, London, have secured the order for the supply delivery, and erection of automatic apparatus at the Grawley and Ifield Sewage Works. The apparatus comprises four armed revolving sewage sprinklers 67 feet diameter, similar to those in operation at Yardly, Kenilworth,

THE BELFAST TOWN HALL.



The Lord Mayor's Screen.

One of the two raised side panels of the Lord Mayor's screen. The sizes are 4 feet by 1 foot 9 inches.

Eastwood, Tenterden, etc., etc. The Consulting Engineer for the scheme is Mr. Sidney R. Lowcock, M.I.C.E., of 50 Queen Anne's Gate, S.W., and the contractors are Messrs. Edwards and Co., of Granville House, Arundel-street, Strand. By a recent mail, the above firm received a testimonial from the Consulting Civil Engineer to the Transvaal Government, stating that the several large sprinklers (Jennings patent) which have been installed on his recommendation in various parts of the Transvaal, have given complete satisfaction.

**Mr. R. DENNE BOLTON.***Vice-President, Dublin Master Builders' Association.*

Mr. R. Denne Bolton, whose portrait we publish in this issue, is the Vice-President of the Dublin Master Builders' Association, and in the absence of the President, Mr. James Beckett, he presided over the banquet to the members of the Building Trades Federation a couple of weeks ago.

Mr. R. Denne Bolton is head of the firm of Samuel H. Bolton and Sons, Rathmines, one of the oldest, if not the oldest, firm in the building trade in Dublin. Mr. Bolton succeeded to the business on the death of his father, the late Mr. Samuel H. Bolton, J.P., nine years ago, and since that time the firm has been engaged in some very large undertakings, notably the Iveagh Trust Scheme for the Housing of the Working Classes, Bull-alley area, at a cost of upwards of £90,000. The first block was opened by King Edward on the occasion of his last visit to Ireland, when Mr. Bolton had the honour of being presented to his Majesty.

The firm has also for some years past been engaged upon the re-modelling of Guinness's Brewery—a very large undertaking.

Mr. Bolton has taken a prominent part in the public life of the city of Dublin and of the Rathmines Township, being a member of the Council of the Dublin Chamber of Commerce, the Rathmines Urban Council, and is Chairman of the Electric Lighting Committee of that body, which, during recent years, has carried into effect an important and successful lighting scheme. Mr. Bolton is also a member of the Rathmines and Pembroke Main Drainage Board, etc.

In a note in our last issue we were in error in saying that Mr. R. Denne Bolton, the vice-president of the Master Builders' Association, was the senior surviving member of the firm of Samuel H. Bolton and Sons. Mr. R. D. Bolton has been the sole proprietor since the death of his father, the late Samuel H. Bolton, J.P., in 1897. The works of the firm are built on part of the grounds of Grove House, Rathmines, not Portobello House. It is interesting to recall that the Grove House estate was purchased from the representatives of the late Henry Grattan about 35 years ago by Mr. S. H. Bolton, and he resided there until the time of his death. Grove House has been pulled down, and the entire estate has now been built over.

The white glazed slabs in the Iveagh Market Buildings, to which we referred in our last issue, were supplied by the Leeds Fireclay Company.

**MODERN ARCHITECTS**

*Apropos* of what Mr. Elliott says on the subject of modern architects, in the work we review in this issue, some remarks of Mr. Charles Henry Israels, which, about a year ago, appeared in our contemporary, the "Architectural Record," of America, occur to us, and may be worth repeating. Mr. Israels seems to offer some explanation of the present peculiar position of the architect. He says that the modern architect, "instead of specialising in the field of art, in which his training should make him supreme," has been more concerned to maintain his business footing. The list of successful practitioners in America, he adds, contains an

undue proportion of men who owe their success to their abilities as organisers and business men, rather than as artists." Such a man devotes an undue proportion of his talents to business and engineering, neglecting the aesthetic side of his work. "The busy architect of to-day does not draw, he does not design." Men, however, even artists, must live; they, like others, are forced to pay rents, rates, and taxes, and many, on whom Mr. Israels' criticism falls, are not directly to blame; they have been forced into this position. Mr. Israels, however, does point to a way out of it. Whether it be a practicable one or not is not for us to say. Mr. Israels observes that where, years ago, the architect had to deal with a few trades only, to-day he has hundreds to cope with. There is also the economical side—everything now-a-days, despite much lavish expenditure, and even waste, is conducted on competitive principles—the lowest "market prices" rule, expert

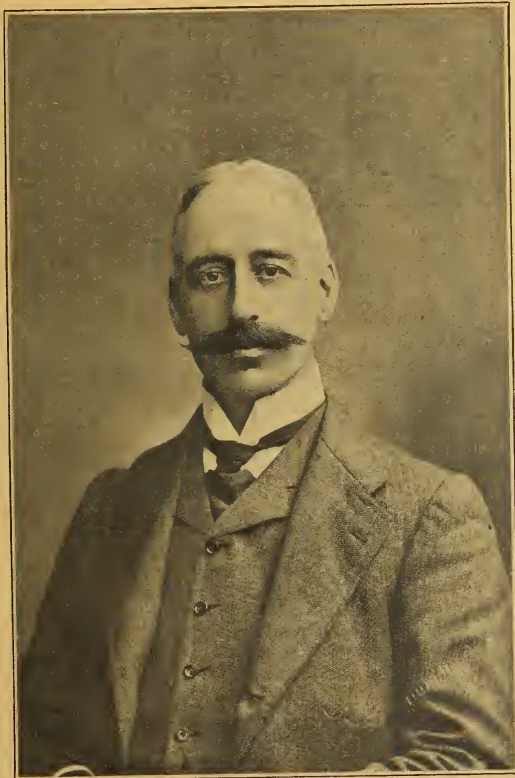


Photo by]

MR. R. DENNE BOLTON,

Vice-President, Dublin Master Builders' Association.

[Chancellor.

knowledge of such a variety of details is asked of the architect as to be beyond the capability of one man's mind. The drawings required of him have been multiplied a hundredfold, supervision is more and more delegated to the clerk of works, so impossible is it to find time for everything. The architect is required to have full control of all who work on the building—in fact, he is the "General of Division"—with an expert staff under him. This may lead to good financial and economical results, but not to artistic success. The only chance for architecture, it would seem, according to Mr. Israels, is for the architect to sacrifice himself, to submit to being relieved of much of the special work which now weighs upon him, and, as master craftsman, as designer, to bow to inexorable laws, and be specialist within his own limits only: to devote himself to his own art more exclusively. Will the architect make this sacrifice for art's sake, and if he does will the public afford him reasonable subsistence—in fact, will they let him live? It must be confessed the signs of the times in this direction are not hopeful.



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## ARCHITECTURAL HOME RULE FOR ULSTER.

With but little surprise, yet with much regret, we have received the information that the Ulster Society of Architects is taking steps to dissolve its affiliation with the Royal Institute of Architects of Ireland. The regret is accentuated by the methods the Northern Society has adopted in terminating the partnership. As long ago as the first weeks of July a resolution was passed by which the affiliation was dissolved, and by the time these lines are in print, a meeting will have been held to make those changes in the bye-laws which the altered circumstances necessitate. Yet the parent body remains without official information, and this drastic action has been suddenly taken with a secrecy which, to many, will bear the obvious stamp of intentional discourtesy.

It is but a few years ago that the Irish Institute, at the request of a number of its Ulster members, consented to the formation of a branch society, affiliated to itself, and known as the Ulster Society of Architects. During the comparatively short time it has been in existence, the younger body has doubtless shown considerable vigour and energy, much of which it owes to the zeal of the ex-President, Mr. W. J. Gilliland. It has initiated classes for students, many of whom have successfully passed the British Institute examinations, and has generally interested itself in the important question of architectural education to an extent that favourably compares with the belated activity of the senior institution.

On broad professional grounds it is, therefore, most regrettable that this vigorous body of architects in

the North should seek to go its own way and withdraw what might prove, if properly applied, a most helpful influence in the counsels and actions of the Irish Institute. It is still more lamentable that the division should occur at the present moment when the registration question is under consideration, and a proposal to found a chair of architecture at Trinity College, and the initiation of a scheme of Irish examinations are forming subjects of discussion between the R.I.A.I. and the Irish Architectural Association. There seems in this country at present to be a general desire to call for a higher recognition of architecture as a profession, and to raise it from the somewhat debased position it has held in the public eye for the last quarter of a century. To achieve the required results unity is essential, and we must confess that the action of the Northern Society could scarcely have occurred at a more unpropitious time. In the last annual report of the Irish Institute it was clearly discernible that many matters affecting the good of the profession had been successfully dealt with, and this, in spite of the fact that the representatives of the Ulster Society had consistently absented themselves from the Council meetings. Therefore we repeat that from a national and professional point of view a divided house is undesirable, and the loss of the Ulster architects cannot be looked on with complete indifference.

From a narrow aspect there is little question that the Irish Institute, as a society, will benefit by the dissolution. Since the formation of the Northern body, the latter has arrogated to itself functions which should, in equity, have been left to the parent institution; and far-reaching resolutions have been passed of major importance, e.g., the four per cent. resolution, and that dealing with building contracts, without any prior reference to the R.I.A.I. Indeed, we know that the senior society has on many occasions felt itself hampered by the hostility which the Ulster Society has endeavoured but thinly to disguise. We published a letter which throws a light on this attitude in our last issue, in which credit for the "First Instalment of Registration" in the Labourers' Bill is sought to be taken from the R.I.A.I. on the grounds that "the Ulster Society brought strong power to bear on the Chief Secretary (it is an open secret and need not be concealed) through one of their members who is a relative of the C. S.'s." *Verbum sap.* Doubtless the Irish Institute, while condoning such tactics has deeply resented them, and will be relieved to find that in future they will be displayed openly.

It may be assumed that the Ulster Society will now seek direct affiliation to the British Institute, and we expect no more than a dignified protest from the Irish Institute at the methods by which the dissolution has been achieved. We fear the split has gone too far for other counsels to prevail, but it is difficult to prophesy to what extent the R.I.A.I. will be numerically weakened. There is no doubt, however, that its remaining members will be more firmly knit together, now that a cause of dissension is removed, and we anticipate, that pursuing its present policy of dealing with architectural matters, and by the infusion of a little more energy into its actions, the Royal Institute of Architects of Ireland will lose little, if any, of its influence as the representative body for the profession in this country. Its good wishes may, therefore, go forth, in all sincerity, to the Northern Society. But it certainly may lack appreciation of the means by which Ulster architects have achieved Home Rule.

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## COMMENTS.

### The Belfast City Hall.

Our Belfast correspondent, in his, what we venture to term, scholarly as well as appreciative criticism of the Belfast City Hall, drew attention to the faultiness in artistic principle of the barrel-roofed portes-cochère, or porticos, as the case may be, which embellish more than one facade of the new building, as blemishes on the general effect of the design; and he also deprecated the meandering walks, amidst indiscriminate patches of grass lawn, which disfigure the surrounding ground. We have since looked through some of the photographs, and we cannot help agreeing with our correspondent's strictures. He and we have not been grudging in our own praise of this truly noble municipal edifice. There is so much in it that is good—far, far beyond the average—that the architect can well afford to allow us to make criticism of minor details. Mr. Bramwell Thomas is a young man, and was a younger still by ten years or more when he won, in open competition by his masterly design, the commission for this important work. May we say at once that we look forward to the time when the portes-cochère and the protruding portico will be removed. They mar the noble lines of the main building. The walks are beneath criticism, and it is doubtful that the architect could have been consulted in reference thereto. The only defect which strikes us in the main facade (always excepting the lack of the base, or plinth alluded to by our Belfast correspondent) is the somewhat abrupt way in which the line set by the tall circular windows of the first floor ranges with the smaller windows of the end wings: this, we fancy, leads to some loss of breadth and dignity.

The problem was a difficult one; the result realised has so greatly exceeded anything that could have reasonably been expected, that the architect need not cavil at these few comments.

The effect of the central statue is far from pleasing, blotting out as it does the chief entrance. The want of a great and imposing central doorway will be by some regarded as a loss; but the tendency, one might say the besetting weakness, of English architecture has ever been to lose sight of the value of this ennobling feature, of which such important use was formerly, and still is, made by the French architects.

### Art and Ireland.

Mr. Robert Elliott's book, entitled "Art and Ireland," with a preface by Mr. Edward Martyn, has reached us for review.

It is with feelings of some misgiving that we approach the task of reviewing it. It is self-evident that Mr. Elliott writes with sincerity, and it is likewise abundantly clear that any such effort as his must be productive of good. It seems, moreover, an ungracious task to criticise when one finds oneself in agreement with so much of what he says. Yet, we feel bound, while agreeing with almost all of Mr. Elliott's precepts, to take exception to many of the conclusions he draws. Nevertheless, the book, if it were never to do anything more, opens a field for friendly discussion to all who deplore the present condition of Art in Ireland, and who desire to see a better state of things brought about—Applied Art being, practically speaking, non-existent in this country. With Mr. Elliott's views we find ourselves in the main in practical agreement, but we equally deplore the way in which he appears to us to, as it were, mix up cause and effect, and to decry both alike.

Mr. Edward Martyn, who writes the brief but concise preface, declares that whatever differences of opinion there may exist as to whether the money of the people has or has not been squandered on the building of churches beyond their means, there can be no doubt that much of this money has, so far as artistic excellence is concerned, been lamentably wasted. As Mr. Martyn observes, it is not pleasant

to think of this. True, he derives some little consolation, which, however, he admits, scarcely perceptibly lessens the regret, from the belief that the modern church art of other countries is in just as bad a way. Had Mr. Martyn stopped short at the expression of his opinion on the decadence of art in Ireland, we should have found ourselves in complete agreement with him; but when he goes on to attribute this falling away to the secular spirit of the Renaissance, we are forced to join issue; as we also are when he says the ecclesiastical art of other nations is at as low an ebb as that of Ireland. In the first place, the day has passed when the threadbare assertions of Ruskin and Pugin as to the "pestilent Renaissance," as the former called it, excites any other emotion than tolerant amusement. We each of us may have our own views as to the influence for good or ill of specific periods, but just as the days of the Inquisition and those of the priest-hunters in Ireland have alike passed away, so in art we have a broader, more catholic and tolerant spirit—a spirit that enables us, even where we differ from others, to give credit for the good that exists in other men's aspirations, and in the influence they exercise on their surroundings, even where we cannot see eye to eye with them. We cannot agree with Mr. Martyn that the great period of the Renaissance had so evil an influence on art. It produced many great men, and true artists who loved their art, and with many of them the spirit that moved was anything but a secular one. The Renaissance gave us St. Peter's, in Rome—with all its faults a great church. It gave us a host of minor and more beautiful churches throughout Italy. In England, St. Paul's is certainly not unworthy to rank amongst great buildings, while in secular work, as distinct from ecclesiastical, such notable achievements as Greenwich Hospital and Somerset House give no cause for shame. In our own land, that brilliant epoch beginning in 1782, gave us buildings in Dublin such as the Custom House and many others. It was, of course, not a church building period in Ireland. Clearly the Renaissance is not the cause of our present low estate; for all that Pugin once declared, "One more week in Rome and I should have lost my faith." He was narrow in his view, and saw good only in the dried bones of mediævalism, great man and artist though he was. The cause must be sought for elsewhere, and the exaltation of the "trade architect" and commercial "church furnisher" must be ascribed to other reasons, and the solution is not hard to find. The unfortunate circumstance of our national history for many centuries past, have almost stamped out artistic feeling amongst the Irish people—as a nation we are not artistic, nor would it be reasonable to expect us to be. While England evolved that brilliant literary epoch of the Elizabethan period, and even in a feeble way developed her art, Ireland was ravaged with fire and sword. The country has but just emerged from the dark ages of constant struggle for bare existence—hard materialism in matters pertaining to art, have left their indelible mark upon the people. Other nations are in their ecclesiastical art sunk not quite so low; the Continent of Europe, it is true, cannot during recent years point to many great and truthful achievements in ecclesiastical art, but the tenour of work in France, for instance, during the past half-century has, on the whole, been far from bad: the work of men like Violet le Duc and Edouard Corroyer alone redeem her from gross materialism in church art, were nothing else attempted; while in England, efforts put forth during the Gothic revival have borne good fruit, and there has, during the past thirty or forty years, been noticeable in that country efforts not wholly unworthy of the great field of ecclesiastical art. The many notable and beautiful buildings erected for the Established Church are, some of them, full of interest and life, while such works as the Brompton Oratory, Mr. Gilbert Scott's church at Norwich, and the new Cathedral at Westminster cannot be ignored. Ireland, alas! stands out in her ecclesiastical art as "miserably decadent," to use Mr. Martyn's own words, and the reason, therefore, lies in the want of artistic education amongst our people and our architects alike. The people, demoralised by centuries of darkness, neither appreciate nor understand good art, the architect is similarly circumstanced, or, in the alternative, is forced to make his views fit in with those of his patron,

who, in turn, has to please his people. Hence, we get the trade artist, the trade sculptor, the trade decorator. Differing to this extent from Mr. Martyn, all the harm we wish his words is that they may, as we trust and believe they will, be productive of good. It is at least encouraging to find one of Mr. Martyn's class and culture once more interesting himself as of old in matters of art. We have, for this reason, dwelt at some length upon Mr. Martyn's preface, because it sets the keynote for Mr. Elliott's work.

Mr. Elliott's "Art and Ireland" is made up of a series of critical reviews of the present condition of things as regards Art in the Catholic Churches in Ireland. Mr. Elliott will forgive us for saying that he does not clearly point the road to a way out of the difficulty. Every man of the slightest artistic instinct revolts against the average modern church in Ireland—"the spire, the gable, the large, round, or oblong window, and the three doors," he is so severe upon—the crockets, the cast-iron ridge ornaments (most hideous of all attributes of such churches). He asks what do they mean? They mean, it must be answered, simply nothing. They express nothing save ostentation. Those who paid for them demanded them, and they got them. Mr. Elliott declares that their designers were not troubled with any emotion craving expression. Very true. What emotion can be expected under such conditions, save the emotion to earn a little money, and to give moderate satisfaction. The same criticism that Mr. Elliott launches against churches in Ireland, has been in somewhat similar form uttered against all modern architecture; Ireland, in this respect at least, is not peculiar. If Mr. Elliott could by a stroke of his pen educate men in Ireland to an appreciation, not alone of the beautiful in the abstract, but to a love for reticence, for simplicity and truth, the problem would be solved. Mr. Elliott carefully refrains from blaming the clergy as a class, and he is right; according to their lights, and without the influence of a great period of native art behind them, they have nobly sought to give expression to the piety and self-sacrifice of their people. The utmost that can be urged against them is that they have attempted too much with the resources at their disposal—not a very ignoble fault after all and those who catered for them were caught by the same spirit, which, naturally enough, brought into being the trade school of church furniture and fittings, whose effort was to give quantity not quality. The latter-day school of Dublin altar maker, for instance, fifty years ago, was a very honest architectural carver, who did fairly good work of the then newly-revived Gothic school, and there were in Dublin at that time quite a number of men who worked as artists under the auspices of Pugin. Their successors have been swallowed up in the torrent of commercialism. History, I take it, will view both them and their patrons with a more lenient eye than Mr. Elliott, for they were the creatures of circumstance. The early period of the Gothic revival in Ireland gave us such churches as Pugin's beautiful Ennisnorthy Cathedral, his distinctly inferior Killarney Cathedral, the late J. J. McCarthy's fine church at Tramore, his churches for the Dominicans and the Capuchins in Dublin, and Goldie's Sligo Cathedral. As Mr. Elliott confines his criticism to Catholic Churches it is not necessary to do more than note that about the same period there were erected several Protestant churches, such as Mr. W. H. Lynn's Carlisle Memorial Church, Belfast; Burge's fine conception, St. Finn Barr's Cathedral in Cork, possessing considerable merit, while more recently we have Sir Thomas Drew's fine Belfast Cathedral; and even the least worthy of those which followed were, at all events, solidly and well built, if subsequently disfigured by deplorable altars and pulpits, vulgar and ostentatious, and stained glass beneath contempt. That terrible spirit which insists upon uniformity, upon "matching," and so forth, is simply due to want of experience. Haste has been the bane of our recent church work; time and thought have had but little place. And we shall see no better results until a wider spread knowledge of art, and of what constitutes the beautiful therein, is brought about.

Domestic architecture is, as Mr. Elliott tells us, at an even lower ebb than ecclesiastical, and for like reasons, though England is at present making a School of Domestic Architecture, some of it not altogether unworthy of comparison with the best of mediæval work.

Mr. Elliott, in his essays on the distinctive features of

Catholic Churches in Ireland, the altars, the stations, the confessionals, the pulpits, and so forth, points out the demerits, and he is rather sweeping in his denunciations—not only are the churches themselves, but their interior fittings, alike bad, and not alone the majority of these, but all, we infer, come in for his censure. The state of things existing is, as we have already conceded, bad, but it is painting the picture in too lurid tones, to say *all* is utterly bad. We venture to say other impartial and competent critics will find, here and there, work that is genuine and good. But having even admitted as true all that Mr. Elliott says, and not quarrelling over little niceties of taste, or what exactly constitutes good and bad, we look, we confess to Mr. Elliott in vain, for any practical guidance. His criticism is freely given, and in the main his censures are deserved, but he is not over generous to the efforts, which, from time to time, are, feebly if you will, but nevertheless distinctly made by individuals to produce an improvement in their own work. Any honest effort in that direction either on the part of the priest, architect, or craftsman is deserving of praise. Mr. Elliott's panacea for all our artistic ills, is the trite advice, "to employ artists" if you want artistic work; the advice is perfectly good, and probably on the same footing as the old saw that "the best man for the army is a soldier." But then soldiers are more easily made than artists, whom others again tell us are "born not made." We may, with propriety, we submit, ask where are the artists to come from in Ireland? Mr. Elliott mentions by name a few ladies and gentlemen to whom he accords that title, but with a sincere respect for their achievements, we suggest that a revolution—and that is what it amounts to, must stand upon a broader basis.

Art education in Ireland has been shamefully neglected. The Hibernian Academy might be a centre of light, but is starved almost to death. There is at the present day in Ireland not a single school for the serious study of applied art in any shape or form. Until lately there was not a single class in which architectural students could obtain instruction in the art side of their diversified calling. Even now they are forced to be content with a couple of struggling classes, under the unaided auspices of a few enthusiasts. But Mr. Elliott rather decrys the architect and bemoans the fate of an artist forced to submit to the mastery of "some fellow with a T square and compass." Yet architecture is the mother of all the arts, and we shall never see a great building without the guiding hand of the master builder, the architect. Mr. Elliott, if we read correctly between the lines of his book, looks, when all is summed up, to the new spirit aroused by what is more popularly than elegantly described as "the arty crafty movement"—if so, those hopes, as embodying a serious change for the better in matters of art, are foredoomed to failure: they are not even original or peculiar to Ireland, but like every other phase of fashion in art, with which this country has been blessed or cursed since, we may say, the thirteenth century, they emanate from England, the present "arty crafty" movement in which country was really "made in Germany," and may be seen elevated to its highest pinnacle in the crazy work now the fashion in Austria, and in a lesser degree in France, dignified with the title of "l'art nouveau." In Austria its spirit is exemplified in the work of Herr Koloman Moser, and in England by the domestic work of Mr. C. F. Voysey. The movement has done good, great good, but it has not in it the elements of a great reformation of taste; it will, we feel certain, prove transient in its effects, and bequeath even less results, in the long run, than the much-abused Gothic revival—and those are pretty well discounted nowadays.

The creation, for instance, of a new style of architecture has been often essayed, but has always been foredoomed to ludicrous failure. During a hundred years England has run the cycle of every fashion in architecture, and so far none has endured. During every such period, or spasm, the fashion has been to exalt some one period and to decry all others. What we mean is, that it is perfectly possible, even now, to design a good Gothic church, or a Renaissance one, given a designer. Our modern art should, of course, be expressive of modern life, habits, feeling, and social or spiritual taste and environment. To suggest that from the dried bones of ancient Celtic art, magnificent as it was in



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FIG 15A. LAVATORY in WHITE ENAMELLED KINGWARE, singles, as shown, or in ranges, with 2-in. washer, vulcanite plug, 1½-in. brass trap, 1-in. valves, porcelain enamelled brackets, £2 15 0. If with 2-in. rod waste, £3 5 0.



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many respects, can be built up a new and living art, is an illusive hope to which the recent revival of the Gaelic tongue has given a fictitious importance. The language may, and is being revived, but the art, in its old form, never. Art is ever changing. The only way in which we may better ourselves is to create first an interest in and then a study of first principles. The public must be first educated to know and appreciate good art, and when the want or demand is created we must furnish, or rather teach, artists to supply it.

The architect in general comes in for severe censure at the hands of Mr. Elliott, and possibly he deserves a good deal of what is said of him; but without him, we shall have no architecture. That is self-evident. Isolated artists working at cross purposes without a master mind at the helm, will never produce satisfactory buildings. There is in Ireland at present no school for the education of architects, and anyone may call himself an architect.

Mr. Elliott illustrates his observations by reproductions of modern Irish work which he commends to his readers, and the examples, if not startlingly great, are deserving of praise for their simplicity and lack of vulgar ostentation.

One of the most interesting chapters in the book is that on stained glass. Most of the glass in Ireland deserves all the hard things Mr. Elliott says of it, but a good deal of it he forgets dates back to a time thirty to sixty years ago when stained glass had become a lost art. Abusing that period is only flogging a dead horse. With all the improvement that has taken place in England of late years, we can still find plenty of churches filled with the most awful productions. The influence of the Munich School has, however, in Ireland effected more evil within its own narrow limits than perhaps any other phase or effort at any time. It has demoralised our patrons, our craftsmen, and our architects alike to a fearful extent, and having regard to the progress made in other matters, there is, perhaps, nothing in existence quite so bad. On the other hand, it is satisfactory to say that its power for evil is largely curbed, and, comparatively speaking, few commissions now go to Munich from Ireland, while of late years at least three or four makers of stained glass in Ireland shew forth a notable if not revolutionary improvement in their work.

If Government treated the Hibernian Academy as it ought to be treated, we should probably see involved a school of applied art—stained glass, mural decoration, metal work, enamels, and so on, which would surprise most people, but we must creep before we walk; and somebody must undertake the education of the young student. A wholesale going over to the tenets of the "arty crafty" movement will never effect a revolution of taste; its present eccentricities are offensive to the majority of people, educated and otherwise. The force of what we say may be proved from the experience of anyone who has been in contact with these matters, plenty of priests will declare that a coloured plaster statue is more devotional in its effects on the people, than the most beautiful marble one! and they speak with knowledge and experience. The severely crude image beloved of the "arty crafty" artist, often only excites astonishment, and even distaste rather than devotion—hence it fails in its object, and is consequently bad art.

Having said so much, it only remains for us to declare our opinion, that howsoever we may differ from some of Mr. Elliott's conclusions, and from the grounds upon which he bases his hopes of improvement, the fact remains that his book is in the main sound, and if he is at times a little strong in his language, it must be remembered that desperate cases require desperate remedies, and as all men competent to judge agree, the present state of ecclesiastical art is not satisfactory, the only real difference between us is how best to remedy the evil.

To all sincerely anxious to help in solving that problem, Mr. Elliott's book will be eminently helpful, even if they do not agree with every word he says; to all such we heartily commend it, because they can hardly afford to leave it unread if they wish to be in touch with what others say and think of this question.

We have only to add that the book is most creditably produced and published by an Irish firm; the type good and clear, and the few illustrations excellent. It is, perhaps, worthy of a more substantial binding.

"Art and Ireland" is published by Sealy, Bryers and Walker, Dublin.

## LESSONS FROM SAN FRANCISCO.

Most of the talk about San Francisco is not edifying. One is reminded of the saying that "whosoever the carcass is there will the vultures be gathered together." Nearly every "expert" who rushes into print seems to do so in a spirit of conscientious hustling; to assert that the evidence is in favour of his material as the earthquake-resisting, fire-proof, covering for steel construction.

The situation is rather like that after the battle of Salamis, when the Greek generals decided by vote which of them was the bravest. Each general had two votes to cast. The result of the ballot (every one receiving one vote while Themistocles got as many as the total number of generals) showed that everyone had voted for Themistocles as well as himself. It was considered, therefore, that Themistocles had been the bravest. Similarly we may consider it agreed that the number of testimonies in favour of the steel frame and ME tells at any rate in favour of the steel frame. But for a disinterested opinion which one can read with real profit we must wait for an official report, such as was made after the Baltimore fire by Captain Sewell of the Corps of Military Engineers at Washington.

In the meantime—just to show how different the point of view may be which will be taken by a disinterested observer, whose motive is purely scientific discovery—a Japanese investigation is reported, concluding that there would have been much less damage from the earthquake if there had been good mortar. As people who have overcome difficulties of their own with earthquakes the Japanese are entitled to respect, even if we had no other experience of their scientific exactness.

This opinion has the merit that it opposes no interest. No material is disqualified by the suggestion that it would stand shocks better if laid up in cement mortar—which appears to be the improvement in mortar that is suggested.

The aggregate elasticity of cement extending throughout the height and breadth of a structure is sufficient to take up the movement of a severe earthquake. But the cure must be not only in the use of cement but in its continuous extension. Cement mortar in the beds with vertical joints half empty can be no great improvement; but if all the joints are full, and the cement is continuous throughout the wall; the brick or other material embedded in it being merely a larger form of aggregate; it seems likely, even to ordinary perception, that a considerable movement can pass along the wall without dislocating its parts.—"The Canadian Architect."

## IMPORTS

### PORT OF DUBLIN.

August 8th, per City of Berlin, from Ghent, 5,226 bags cement, to order.

August 9th, per Lady Roberts, from London, 600 sacks cement, T. Dockrell, Son and Co., Ltd.

August 10th, Lord Lansdowne, from Baltimore, 2,100 pieces oak lumber, 176 tons roofing slates, 1 barrel asphalt, to order; Wingo, from Goteborg, 15 cases glass, 3 cases turned wood, 3,487 pieces battens, 10,637 pieces boards, 4,600 pieces red wood, 1,838 pieces white wood, 3,670 bundles laths, to order; per Velinheli, from Port Dinorwic, 100 tons slates, W. and L. Crowe, Ltd.; per Clyde, from Paisley, 110 tons fireclay goods, Betson and Co.; per Annie Christian, from Bridgwater, 125 tons bricks, Brooks, Thomas and Co., Ltd.; per Lady Martin, from London, 50 packages 20 casks lead, T. Dockrell, Son and Co., Ltd.

August 13th, Birgit, from Lapelo, 298 logs hewn pitch pine, 1,051 pieces sawn pitch pine timber, 1,176 pieces deals, W. and L. Crowe, Ltd.; per Glanariff, from Middlesboro, 200 tons cement, Corry and Son; per Falcon, from Portmadoc, 110 tons slates, J. Archer; per Marion, from Barnstaple, 108 tons bricks, Betson and Co.; per Mary Peers, from Rochester, 230 tons cement, A. Agnew.

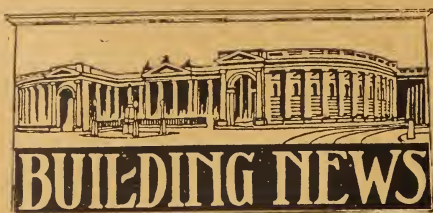
August 14th, per Marion, from Bridgwater, 87 tons bricks, Monsell, Mitchell and Co., Ltd.; 18 tons bricks, E. H. Tickell.

August 15th, per Valde Travers, from Treport, 200 bags plaster, to order; per New Design, from Bridgwater, 150 tons bricks, J. Archer.

August 16th, City of Hamburg, from Rotterdam, 2 cases window glass, 1 case tiles, to order; per Lady Wolsely, from London, a quantity of timber, to order; per Lady Hudson-Kinahan, from London, 200 sacks whiting, T. Dockrell, Son and Co., Ltd.

August 21, per Edith, from Troor, 30 tons fireclay pipes, J. McVey, at Balbriggan; per Secret, from Bridgwater, 125 tons bricks, T. and C. Martin, Ltd.





**Ballina**—The Council of above district received tenders for the erection of boundary wall, &c., enclosing new addition to Glenduff Burial Ground.

**Blackrock (Co. Dublin)**—The Urban District Council invite tenders for (a) Overhauling and repairing roof; (b) Erection of gas fittings; (c) Extension and repair of present ceiling; (d) Relaying of present floor; (e) Decorating and painting walls, &c. Specifications can be seen, and full particulars obtained at the Surveyor's Office, Town Hall, Blackrock. Materials must be, as far as possible, of Irish manufacture. Tenders 4th prox.

**Cork**—Tenders were received for additions to houses in Evergreen road, Cork, for Mr. P. Ahern, in accordance with plans and specifications prepared by Messrs. W. H. Hill & Son, architects, 28 South Mall, Cork.

**Collooney (Co. Sligo)**—Extensive repairs and renovation of the parish church are being carried out by Mr. Joseph Taaf, contractor, Upper Buckingham street, Dublin, under the supervision of Messrs. Doolin, Butler & Donnelly, architects. Lead glazing throughout by Messrs. Early & Co., Dublin.

**Chapelizod**—This ancient village is undergoing a much-required reconstruction. As the leases are falling in, the houses are being demolished and new ones erected by the ground owner. One has just been finished by Mr. Michael Moran, builder, and two are in progress by Messrs. Whelan Bros., builders, Arbour place, Dublin.

**Clones (Co. Monaghan)**—The Urban District Council of Clones invite tenders for laying concrete and other footpaths, curbs, channels, and granite crossings, &c., all within the Urban District. For excavating and removing to spoil some 2,500 cubic yards of earthwork at the Council's Waterworks Reservoir, in the townland of Carnoe. Contractors must submit with their offers particulars of similar works executed by them in a satisfactory manner, and no offer will be accepted by the Council unless from an experienced person. Tenders 1st September, 1906. The Council will also consider applications from competent Clerks of Works for the supervision of the work in connection with the footpaths. Applicants must have had previous extensive experience in this class of work, and should send copies of testimonials. They should also state rate of remuneration per week for their services, and must devote their whole time to the work of the Council.

**Dublin**—Messrs. Thomas Dockrell, Sons & Co., Ltd., South Great George's-street, Dublin, have recently remodelled Nos. 16, 17 and 18 Ely-place, under the supervision of Mr. Thomas Manly Deane, architect, 15 Ely-place, Dublin.

Mr. James Beckett, Ringsend-road, Dublin, is engaged in extending and enlarging the factory of Messrs. Cantrell and Cochrane, Ltd., 17 Nassau-place, according to the plans and specification of Mr. G. F. Beckett, architect, 97 Stephen's green, Dublin. Heywood's patent glazing is being used.

Mr. Golding, contractor, is building fourteen houses on the Villiers road, Mr. G. F. Beckett being the architect.

Mr. G. F. Dunn, Camden street, Dublin, has been making alterations and repairs to Larchhill Pine Forest, Whitechurch, to render it suitable for a private sanatorium for consumption. It has now been opened. Dr. L. A. Hare, resident physician. Mr. G. F. Beckett being the architect.

Plans for the following works have been prepared by Mr. F. W. Higginbotham, A.M.I.C.E., of 9 Lower Sackville street, Dublin, and estimates have been obtained for the work:—Alterations are to be made to the premises of Messrs. Monson Robinson & Co., printers, Talbot street, Dublin, and No. 40 Lr. Ormond quay, which was destroyed by fire, and is to be reconstructed.

The contract for the first section of the roadways for the Merchants Warehousing Co.'s large housing scheme has been secured by Messrs. Collen Bros., Ltd., East road, Dublin, who are now starting the work. It will be pushed on rapidly in order to permit of a number of the cottages being commenced this year.

Work is now in progress on the premises of Messrs. Trulock, Harris & Richardson, gun smiths, of Dawson street, whose premises were wrecked some time ago by a gunpowder explosion. The reconstruction is being carried out by Messrs. J. F. Keatinge & Sons, of Grafton street, Dublin.

A contract has been signed with Mr. Peter Byrne, builder, for extension works at the Dublin Pure Ice and Cold Storage Co., Architect, Mr. Higginbotham.

Tenders were received for rebuilding Messrs. Grennell's premises, 30-33 Lower Camden street, to the designs of Mr. Albert E. Murray, C.E., F.R.I.B.A. Quantities were prepared by Mr. James Mackey, 58 Dame street, Dublin. Messrs. Hall & Co., Pembroke Works, Ringsend, were the successful contractors.

Tenders have been received for rebuilding Nos. 51, 52 and 53 South King street, Dublin, for Miss Laird, of the Paris House, Grafton street, according to the designs of Mr. J. Hampden Shaw, Westmoreland street. Quantities were prepared by Mr. James Mackey, 58 Dame street, Dublin.

The electric lighting sub-station at Fairview, for the Corporation of Dublin, is now being erected by Mr. P. Shortall, contractor. Quantities were prepared by Mr. James Mackey from the designs of the City Architect.

Messrs. Helliwell, of Brighouse, have received the order for about 7,000 super. feet of patent glazing, to be used in the roofing of Messrs. Todd Burns & Co.'s new premises in Dublin. Messrs. W. M. Mitchell & Sons are the architects.

At a recent meeting of the Corporation, Alderman Kelly moved, and it was resolved to adopt, a report of the Public Libraries Committee with reference to the offer made by Mr. Andrew Carnegie to grant a sum of £28,000 for public library purposes in Dublin, and requesting authority to proceed with the works of building the new public library at Great Brunswick-street and extending the Charleville Mall Library, the cost to be defrayed out of the said sum. He mentioned that the grant had been given in consequence of an application made by Sir Thomas Pile to Mr. Carnegie.

**Drogheda**—The fancy fair and fete organised by the Misses Smyth, Greenhills, in aid of the fund for the building of a Cottage Hospital in Drogheda, proved an undoubted success, realising a sum of £117. The committee have secured on favourable terms a lease of a plot of ground in Scarlet-street, and as they have now between £700 and £800 at their disposal, building will be shortly commenced.

**Dalkey**—Mr. Henry Pemberton, of Killiney, has just completed for the Dalkey Urban District Council, under the supervision of Mr. S. R. Goings, M.Inst., C.E.I., Engineer to the Council, three additional cottages, also the laying of a sewer in Saville Park.

**Donabate**—Messrs. Tomlin and Sons, Grantham-place, Dublin, have been entrusted with the contract for the new high altar, Donabate Church, County Dublin. The altar has been designed by Mr. G. L. O'Connor, M.R.I.A.I., 198 Great Brunswick-street, Dublin, who is also the architect for the church.

**Edenderry**—The Rural District Council will at their meeting on Tuesday, the 4th day of September, 1906, consider tenders for the building of thirteen labourers' cottages, erecting all out-offices attached to same, and fencing plots.

**Kells**—Mr. Charles Pigott, Kells, has just built a handsome residence for J. H. Nicholls, Esq., at Kingscourt, according to designs and specifications of Mr. G. F. Beckett, 97 Stephen's green, Dublin.

**Galway**—The Urban District Council will, on 6th prox., receive designs for a labourer's cottage, containing three rooms and a kitchen, with specification and detailed estimate, the cost not to exceed £80. A prize of £5 will be given for the selected design if approved of by the Local Government Board.

**Greystones**—Mr. Henry Evans, contractor, Greystones, is building additions to Mr. C. R. Morgan's house at Greystones, according to the design of Mr. A. E. Murray.

**Kinnegad**—The ceremony of laying the foundation stone of the new church at Kinnegad is to take place on Sunday, the 2nd prox. The ceremony will be performed by the Most Rev. Dr. Gaughran, Lord Bishop of Meath. The contract for the building has been secured by Mr. J. Wynne, of Jocelyn place, Dundalk.

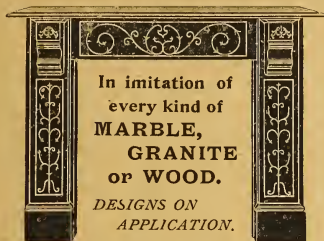
**Kingstown**—The handsome cut-stone base and ornamental railings around St. Michael's Church, Kingstown, is now completed, and forms a very desirable improvement to this fine edifice. The work was completed under the designs and superintendence of Mr. G. L. O'Connor, 198 Great Brunswick-street, Dublin.

**Lurgan**—Additions will be made to the Industrial School at the Lurgan Convent of Mercy, according to plans and specifications of Messrs. Ashlin and Coleman, Dawson-street, Dublin. Mr. D. W. Morris, 68 Harcourt-street, Dublin, is the quantity surveyor.

**Lisburn**—The Local Government Board have fixed a term of forty years for the repayment of the loan of £3,000 for building a new Town Hall.

**Navan**—A new branch for the Belfast Banking Co., Ltd., is being erected in Navan by Messrs. W. J. Campbell & Son, Belfast, according to the designs of Mr. Anthony Scott, M.S.A.,

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Quantities prepared by Mr. James Mackey. Messrs. J. & W. Clarke, Clanbrassil street, Dublin, are the contractors under the same architect for new business premises, Moore street, Dublin.

**Queenstown**—The contract for the new Sacristies for Saint Coleman's Cathedral, Queenstown, has been given to Mr. Sisk, builder, Cork, the amount of tender being £5,579. Plans and specifications are by Messrs. Ashlin and Coleman, 7 Dawson-street, Dublin. Mr. D. W. Morris, of Dublin, was the surveyor.

**Omagh**—A sub-committee of the joint committee of management of the District Lunatic Asylum has been appointed to meet Mr. Butler (Doolin, Butler & Donnelly, architects to the asylum), for the purpose of drawing up an outline scheme for a new sanitary system and mode of sewage disposal.

**Rathkeale (Co. LIMERICK)**—Following the Local Government Board inquiry recently held as to the erection of labourers' cottages in the Rathkeale district, the Inspector has recommended sanction to the erection of 51 new cottages and the provision of 34 additional half-acre allotments.

**Co. Tyrone**—The courthouse at Omagh is to be altered according to the plans of the County Surveyor, Mr. F. J. Lynam. The two existing wood and glass domes are to be dispensed with, and two new domes are to be erected in their place. Messrs. Helliwell & Co., Ltd., of Brighouse, Yorkshire, and 17 Nassau street, Dublin, have been asked to supply and fix their patent glazing. Mr. M. S. Buchanan, their Dublin agent, has also secured the order for the patent glazing on the new college, Killynery, and also for the "Monster House," in the same town. Messrs. W. H. Byrne & Sons, architects.

**Waterford**—Mr. George Nolan, builder, Waterford, has been enlarging Leoville, the residence of A. S. McCoy, Esq., Waterford, according to designs and specifications of Mr. A. E. Murray, R.H.A., F.R.I.B.A., F.R.I.A.I., 37 Dawson-street, Dublin. The house has also been greatly improved by taking away the old entrance from the back and building a new porch entrance at the front overlooking the river.

Mr. Howard McGarvey has secured the contract for the heating of the County Infirmary, Waterford, which has recently been built according to the design of Mr. A. E. Murray.

#### A.A.I. ANNUAL EXCURSION, 1906.

The excursion to Northamptonshire is now a thing of the past, but will long remain unforgettably, as on all hands it is voted to have been an unqualified success. Architects are popularly supposed to be of an artistic and consequently congenial temperament (except by erring contractors), and the party, to the number of fifteen, which left for Liverpool on the evening of August 10th, were evidence that public supposition is, in this instance, correct. The President struck the right note by commencing to sketch before the "Cork" left her moorings; perhaps he, in common with many on board, was struck by the unusual gathering of the fair sex on the North Wall to see the boat off.

The crossing to Liverpool may be described as fair to medium, and it was noticeable that a few of the members became somewhat serious and introspective before "last post" was sounded and a move was made to the lower deck. However, all were on land the next morning, perfectly fresh and so energetic that the special bus which conveyed the party to the station at Liverpool was only kept waiting for twenty minutes; and here let me give a meed of admiration to the Midland Railway Company, which provided special carriages, and looked after the comfort of the party, going and returning, most carefully, both in sharp contrast to the action of some companies in former years. Northampton was reached early on Wednesday, and that day was spent visiting the Assize Courts, St. John's Hospital, Queen Eleanor's Cross, St. Peter's Church, and the Church of the Holy Sepulchre. The Anglo-Norman work at St. Peter's and the "Round" at St. Sepulchre's attracted much attention, but at this stage some of the members, doubtless fatigued by the journey, turned their attention to that modern architecture, of which we have more than a fair share at home.

On Thursday, the party having slept at the George Hotel, Kettering, the two chief buildings visited were Kerby Hall and Drayton House. The former, a magnificent Elizabethan mansion, is in ruins and unoccupied, except for a caretaker. Here Mr. Roche, the agent for the owner, the Earl of Winchelsea, met us, and very kindly pointed out the chief items of interest, and gave every facility for sketching. Drayton House proved intensely interesting, and on our arrival we were welcomed by S. G. Stopford Sackville, Esq., who hospitably entertained us to tea, and permitted the members of the party to wander at their own free will through the house and its beautiful surroundings. Here also we were met by Mr. J. A. Gotch, F.R.I.B.A., the well-known writer on English Renaissance, who acted as cicerone at Drayton, and to whom the Association is greatly indebted for the valuable assistance he rendered in preparing the itinerary of the tour. We had the pleasure of Mr. Gotch's company at dinner in the evening, after which a four-handed billiard match, Ireland v. England, was played. It might not be good taste to say who won, but there

been a challenge cup, it would now be ornamenting certain premises in S. Frederick Lane.

Friday was devoted to visiting a large number of churches in the vicinity, and the interest of members was fully maintained up to about the seventh church, when ecclesiastical work began to pall upon a few, and a demand to visit houses, either public or private, was made to the honorary guide. With much craft he suggested that in one of the coming churches a well-known and peculiarly interesting gargoyle would be found, and for the remainder of the day each building was subjected to such an analytical examination by the whole party that we were all late for dinner. Only one church, Wellingborough, was missed from the programme, and an esteemed ex-President was much grieved thereby, having, as he said, made the excursion for the sole object of seeing it. Credit was given to his statement, as other buildings did not appear of such attraction to him as to necessitate the production of a sketch-book, until it was time for the party to move on.

Saturday morning was devoted to Rushton Hall and Rothwell. The former is an imposing building, upon the interior of which the present lessee, Mr. Van Alen, has recently spent £100,000. It is encouraging to hear that the owner would not permit of any change being made to the exterior of the building. Mr. Van Alen is at present in America, and his letter of permission to visit the house arrived only in the nick of time. At Rothwell the Market House and Church, with its bone crypt, occupied over an hour, after which the party drove back to headquarters, had lunch, and left at 3.10 for Liverpool, and home. The evenings were generally given up to singing, billiard matches, and similar amusement, although after dinner most of the members usually were ready for bed. The last night was celebrated by an impromptu concert, which necessitated rousing the unfortunate member who was occupying a stretcher in the drawingroom. In the small dance that followed his summer costume was much envied for its coolness.

Throughout the excursion the weather was all that could be wished for, the creature comforts were admirably looked after; the programme—a very formidable one—was gone through without a hitch; and last, and most important, the architecture was full of intense interest to the man with the pencil, the brush, and the camera. Seldom has so much work been done on an excursion, and records have been brought home, which will doubtless form the subject of a delightful paper when the winter session begins. It is to Mr. Bradbury that the thanks of the Association are entirely due, for giving us, possibly, the best excursion that has yet been held, certainly by far the best arranged. The piecing together of the heavy programme in itself must have entailed much labour, and everything was carried out so economically that the low subscription was not exceeded. His recompense lies in the fact that every member thoroughly enjoyed the tour, and fully appreciated the forethought he bestowed on the arrangements. By the courtesy of Mr. Bradbury, a few of his sketches during the excursion are included in this issue.

"WEE MACGREGOR"

We understand that Messrs. R. W. Blackwell & Co., Ltd., have disposed of the departments of their business dealing with "Ruberoid" roofing, "Ruberoid" Dampcourse, "P. and B." insulating papers and paints, "Giant" building and damp-proof papers, to the Ruberoid Co., Ltd., who have taken offices at Waterloo House, 81-83 Knight-rider Street, London, E.C. The new company will carry large stocks of the goods mentioned at their London Warehouse, and we feel sure that the high standard of quality which has always been characteristic of these specialities in the past will, under the new company, be, if anything, even more marked. Any enquiries will receive immediate attention if they are addressed to the Ruberoid Co., at Knight-rider Street, London, E.C.

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# ENGINEERING SECTION.

## ITEMS.

The half-yearly reports of the leading Irish Railway Companies have proved on the whole fairly satisfactory, and present appearances justify the assumption that better times are rapidly approaching. For many years past the companies have had to deal with exceptional expenditure, caused by the necessity of re-laying the tracks with new metals to meet the conditions arising from the introduction of heavier rolling stock. In order to cope with modern demands for comfortable travelling, corridor coaches have had to be built, and consequently a distinct type of locomotive. In addition, some of the companies have suffered financially through the purchase of lines which, even yet, are by no means remunerative. But after the lean years it would seem that business generally is on the increase, that outlay is becoming normal, and that the depressed condition of Irish railways will shortly give way to, at all events, comparative prosperity. And as the reports of railway companies are a reflection of the general state of trade, the result of the recent half-year's working is distinctly encouraging.

That the Irish Railways' Commission has no representative of railway interests has been a common complaint of all the companies, and there is no doubt that combined and strenuous effort will be made to secure adequate representation. At present the members of the Commission are—Charles Scotter, chairman; the Right Hon. Lord Pirrie, Sir Herbert Jekyll, K.C.M.G.; Lieutenant-Colonel William Hutcheson Poe, and Messrs. Thomas Sexton, William M. Acworth, and John A. F. Aspinall. The Secretary is Mr. George E. Shanahan, the Assistant-Secretary to the Board of Public Works, Ireland, whose knowledge of railway matters should prove of valuable assistance during the course of the enquiry. It is probable that the first meeting will be held in London during the month of September, but the permanent session will be held in Dublin, in which city the offices of the Commission will be situated. It is scarcely possible for the taking of evidence to commence until October.

The Engineering Department of the Trussed Concrete Steel Company of Detroit, Mich., U.S.A., has issued a very useful little pamphlet on the practical calculation and application of reinforced concrete, which is stated to be the outcome of years of experience, practice, and experiment with this essentially modern method of construction. Whilst the calculations are based particularly on a special system, "The Kahn," yet the data given are, as far as we have yet seen, the clearest for the use of the architect and engineer in ordinary practice, and certainly, the tables will fill a vacancy in engineering libraries. In a scientifically correct method of reinforcement, the most essential requirement is that the diagonals should be a part of, or rigidly attached to, the main horizontal tension member, and the Kahn system has been developed and successfully applied on this principle. The theoretical analysis, upon which the tables are formed, is based upon the following assumptions:—

1. That the section plane before bending remains plane after bending; that is the stress of any fibre is proportional to its distance from the neutral axis.
2. The applied forces are perpendicular to the plane of the neutral axis.
3. There are no initial strains on the beam.
4. There is no slipping between the concrete and the steel, and all shearing strains are provided against.
5. The tensile strength of the concrete is entirely neglected.
6. The stress strain curve of the concrete in compression is a parabola.

With these axioms it has been found practicable to draw up reliable memoranda as to the safe live loads borne by reinforced concrete beams of various depths over different spans. It is interesting to note that a beam 20 inches in depth, reinforced with a  $\frac{3}{4}$  inch by  $\frac{1}{4}$  inch Kahn Trussed Bar, will bear safely a live distributed load of close on two tons over a span of 40 feet, and about seven tons for half the span. It is, of course, in the shorter spans that, by its lightness and elasticity, the reinforced concrete beam is of the greatest value. The width of such a beam is calculated at seven inches. Amongst the tables will be found the safe live loads on girders, floors, columns and footings, and the architect or engineer who may find himself suddenly called on to design in reinforced concrete will readily appreciate the valuable information which is now available for his use.

The further developments of the difference of opinion between the Cork Corporation and the Commanding Officer of the Cork troops as to the purity of the city water supply promise to become acute. It will be remembered that the matter was brought prominently forward in a paper read by Major R. Jackson, R.A.M.C., before the Section of Bacteriology and Chemistry, at the recent Congress of Public Health held in the Southern metropolis. His condemnation of the water supply met with spirited retort, and the Water-works Committee gave an unequivocal denial to his allegations. But it would appear that the military authorities are not content, and an analytical report by Lieut.-Col. Davies, R.A.M.C., Professor of Hygiene, contains the statement that the drinking water supplied by the Cork Corporation is polluted with animal (or human) excreta. With this evidence before him, the officer commanding has now threatened to permanently withdraw the troops. Such a step would prove, undoubtedly, a serious loss to the city, but it scarcely appears that sufficient credit has been given to the Cork officials for the sustained effort they have been making to improve the quality of the water supply, and further works to that end are at present in progress. Having regard to the general health of Cork, as evidenced in the Registrar-General's return, it cannot be assumed, with any degree of certainty, that the city is suffering under disabilities inapplicable to other centres which derive their supplies from similar sources.

It is interesting to observe the steps that are being taken to popularise the Doonagore Quarries, Co. Clare. From time to time the owners, Messrs. George A. Watson and Co., Ltd., have invited parties of engineers, architects, and contractors to visit these quarries, in order to inspect the stone and the methods by which it is obtained. The stone, known as the "Shamrock," is a hard, clean, close-grained millstone grit, of a blue-grey colour, and is becoming well known in this country for its appearance and durability. But the proprietors are not content with such recognition, but are sufficiently enterprising to bring its qualities into wider prominence. As a result, large orders have already been received from London, Liverpool, Cardiff, Birmingham, etc. It is clear evidence of the business that awaits other quarry-owners if they would but rouse themselves from their apathy and take some steps to gain more than local notoriety for their stone. Ireland is so rich in excellent limestones and granites, that a considerable augmentation of wealth would occur if her quarries were more generally worked on modern energetic lines. It often occurs at present, if an Irish stone be desired in a particular work, it is delivered by the proprietor rather as a favour, and certainly at his own leisurely convenience. This failing is noticeable, in perhaps a somewhat lesser degree, in cases where stone from England and Scotland is required. It therefore only remains for the Irish quarry owner to rouse himself, to practically oust all "foreign" importations, and at the same time afford some relief to the long suffering engineer or architect, who, while waiting with what of patience he can muster for plinths and columns, often wishes it were possible to commence his building with the roof.

Between Newcastle-on-Tyne and its suburb of Heaton, is being constructed the largest conduit yet designed, its height being 22 feet and maximum width 33 feet, thus providing an internal area of about 584 square feet. The work is being carried out in order to convey the waters of the Ouseburn along a valley which it is proposed to fill up and utilise, part for highway and part for building purposes. As the Ouseburn varies from a small stream in times of drought to a swift torrent in time of flood, the conduit has to meet with exceptional conditions, and to add to the difficulties of the engineer, the length, 700 yards, and the weight of earth above, which will be about 100 feet in depth had to be taken into consideration. Eventually, it was decided to use the Hennebique system of ferro-concrete construction, and the conduit is being carried out with a parabolic cross-section. It is interesting to note that, notwithstanding the size of the conduit and the superincumbent weight of earth and buildings it will eventually have to withstand, the crown is but 8 inches in thickness, a figure which strikingly indicates the stress which this method of construction is capable of bearing.

The monument to Constable Sheehan, who lost his life in the Burgh-quay sewer disaster, some months ago, was recently unveiled, the ceremony being attended by a large number of citizens, as well as by contingents from the police and fire brigade. The incident thus commemorated the conspicuous



bravery which it brought forth, and the heroism of the young constable who so readily gave his life for his fellows, are still fresh in the minds of his countrymen. We cannot help wishing that a simpler monument had been raised to Sheehan's memory. From an æsthetic point of view, it leaves much to be desired, and the heavy stone cross with which it is surmounted seems scarcely at home, rising from an exceedingly stiff stone crown, which in turn rests on a very severe and uncomfortable looking stone cushion. The situation of the memorial at the end of Hawkins-street, in the centre of the roadway, is also inconvenient for vehicular traffic leaving or approaching the Royal Theatre. Engineers may not be the best possible critics of the beautiful, but we are of opinion that modern Irish art could have evolved something less conventional, which would have added one more feature to the streets of Dublin. And this for less expenditure !!

## REINFORCED CONCRETE.

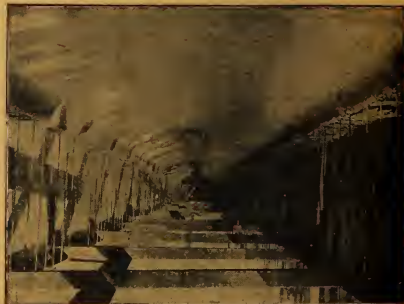
### The Indented Steel Bar.

We are indebted to the Patent Indented Steel Bar Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W. for an interesting booklet dealing in general terms with the subject of Reinforced Concrete with particular reference to the advantages of the Indented Steel Bar.

All investigations on the strength of Reinforced Concrete Beams are based on the assumption of a combined and synchronous action of the two materials, and the formulae which have been evolved for the various systems of construction presuppose such action. It follows, therefore, that a reliable and indestructible bond between concrete and the embedded reinforcing metal is the first essential of a well-designed structure of reinforced concrete, if the work is to give satisfaction and endure. It has been established that there is a high factor of adhesion between steel and concrete, even when the steel presents a plain surface without any mechanical key. But most of the experiments made to prove this fact have been carried out with bars simply embedded in concrete, and which have been subjected to no strains, shocks, or vibrations, although these are the very things which in constructive work reinforced concrete has to withstand. Consequently it may be said that the probability of continuous adhesion is at best an uncertain quantity. It presupposes the most minute care in every detail of the construction, such as, for instance, the mixing of the concrete and the preservation of the steel from rust, it having been shown that the adhesion of plain bars is reduced as much as 60 per cent. by immersion in water for a considerable period. The question, therefore, naturally presents itself whether it is not highly desirable to introduce a mechanical bond or key between the steel and con-

requires that the sides of the projections or ribs on the bar shall not vary from a plane at right angles to the axis of the bar by an amount greater than the angle of friction between concrete and steel. In the Indented Bar this condition is complied with, and it is indeed claimed that it is the only bar that can be rolled in such a way as to satisfy this essential.

The patentees and makers of the Indented Bar are not, however, satisfied in confining themselves to this desideratum only, as the following considerations will show. Professor Talbot, of the University of Illinois, U.S.A., has shown that a reinforced concrete beam will, on an average, carry only 6 per cent. additional load after the stress in the steel has reached the elastic limit. The elastic limit is thus seen to be practically the ultimate stress to which the reinforcement can be subjected, and it is accordingly desirable, for the sake of economy of material, that this limit should be fairly high. The Indented Steel Bar has an elastic limit of about 55,000 lbs. per square inch, whereas



NEW ORLEANS DRAINAGE CANAL UNDER CONSTRUCTION.

ordinary reinforcing material has an elastic limit of about 30,000 lbs. Basing the factor of safety on the elastic limit, a comparison of these two figures shows the great economy in material for equal strength and equal quantity of concrete, which is effected by employing a high elastic limit steel. Owing to the scientific manner in which the mechanical bond is applied in the Indented Steel Bar, the utilisation of this high elastic limit is fully availed of, while at the same time this bar requires no special formulae for the design of ferro-concrete work, but is an economical and safe reinforcement for all systems of construction. The Company have, however, developed their own formulae of design based on the most modern and scientific practice, and are prepared to give advice to anyone contemplating the design of reinforced concrete work.

It may be stated that the Indented Steel Bar has been almost universally adopted by the American Railroads for all reinforced concrete work, such as arch bridges, culverts, viaducts, both of the arch and flat slab type, abutments, retaining walls, subways, warehouses, round houses, &c. Over 50,000 tons of these bars have already been used in construction, and we are enabled to give two illustrations of work which have been executed by the company. They are respectively an "end view of dividing wall of Indianapolis Co.'s Reservoir," and "The New Orleans Drainage Canal under construction." We understand that a catalogue now in the press contains over one hundred drawings and illustrations of work done with the Indented Bar, and that it will be sent on application.



END VIEW OF DIVIDING WALL OF INDIANAPOLIS CO.'S RESERVOIR.

crete. Continental engineers who are mainly responsible for the use of plain bars, are now realising the cogency of this aspect of the case, and recent regulations controlling work of this kind in Germany recommended that the bond shall, as far as possible, be a mechanical nature. It is noticeable, also, that French engineers are turning up the ends of plain rods in an endeavour to achieve the same purpose.

The Indented Steel Bar has been introduced to supply a reinforcement which shall ensure a scientifically accurate mechanical bond. To attain this it is necessary that the bond shall be so formed as to have no tendency to split the concrete. This

**Dundrum.**—The Local Government Board, having written to the Rathdown No. 1 Rural District Council that the sewerage of Dundrum should be completed within two years, the Council have appointed Mr. P. H. McCarthy, B.E., 39 Westmoreland-street, Dublin, to prepare the necessary plans, and to act as their engineer for the carrying out of the work.

The Home Secretary has appointed a departmental committee to inquire into the dangers attendant on building operations, to prepare a draft for regulations embodying precautions which may in their opinion be desirable for the safety of the workers.

The members of the committee are:—Mr. William Dawkins Cramp, I.S.O., Deputy Chief Inspector of Factories (chairman); Mr. John Batchelor (Operative Bricklayers' Society), Mr. E. T. Jessop (Amalgamated Society of Carpenters and Joiners), Mr. William Shepherd (London Master Builders' Association), and Mr. Alexander R. Stenning (Surveyors' Institution). Communications on the subject should be addressed to the Secretary, Mr. Leonard Ward, Home Office, Whitehall.

**MR. GEORGE H. FELLOWES PRYNNE, F.R.I.B.A.**

Mr. George H. Fellowes Prynne, whose portrait we publish, is one of the leading ecclesiastical architects in England, and one who still holds to his early love for Gothic work, conceived in the spirit of George Edmund Street, whose pupil he was. Mr. Prynne has seen life in many lands, and resided for several years in America. Apprenticed to Street, he acquired the strongest liking for that master's work. Starting in practice for himself, he has during the years which followed designed and carried out many important churches. Amongst the largest he has at present in hands are St. Martin's, Worcester, and the new cathedrals at Capetown and Johannesburg. Mr. Prynne is the son of the late Rev. Mr. Prynne, Rector of Plymouth, and is a fellow and member of Council of the Royal Institute of British Architects. He was two years president of the Architectural Association, at whose excursions he is a regular attendant. He is a pleasant and genial personality, popular with all who know him.

**ARCHITECTS & ENGINEERS TO DISTRICT COUNCILS.**

*Apophos* of the recent controversy upon the addition of a clause relating to the experience and qualifications of persons appointed as engineers, architects, District Councils and surveyors to in connection with the Labourers Acts, the following discussion, which lately took place at a meeting of the Millstreet Rural District Council will be found instructive:

In response to the Council's advertisements inviting applications from competent persons willing to act as engineer to the Council in connection with the repairs to all existing cottages erected within the rural district, there were eight replies, viz.:—

Michael Dennehy, Millstreet, at £8 per year; Timothy O'Shea, do., £9 per year; James P. Buckley, do., £20 per year; Timothy O'Callaghan, Mount Leader, £20 per year; Patrick McAuliffe, Boherbee, £30 per year; Daniel O'Connor, Cullen, £30 per year; Jerome H. Howard, Glenleigh, £31 4s. per year; and Jerome D. O'Sullivan, Coolermore, £35 per year.

Mr. J. D. O'Sullivan—Before the applications are considered, I would like to know is it the lowest that will be accepted?

The Clerk (Mr. J. S. O'Connor)—It does not follow at all. You might get an application from a person who knows nothing of the business.

Mr. J. D. O'Sullivan—I propose Mr. Timothy O'Callaghan. He is a competent man.

Mr. M. O'Sullivan—Excuse me, Mr. O'Sullivan, for a moment. Gentlemen, would it not be well to elect your

old engineer again, say, for six or twelve months, at £30 a-year. He is a very competent man. He could not be expected to do very much work in the past. His salary was so small. There will be a new order coming into force soon, and you will have to employ a qualified man; so I think you might be unanimous and elect him for another year, or even six months. I am sure the majority of the candidates would withdraw in his favour, and as the term is so short I would again ask you to be unanimous, and elect him.

The Chairman—No one in the room knows Mr. Howard as well as I do. He was chairman of this Board for some years, and when we elected him as our engineer we thought he would be a boon to the ratepayers and to the labourers,

but what was the result? Mr. Howard was too decent, and overlooked many things till labourers and contractors could do what they liked. As I said before, he is a man whom I have the greatest respect for, and the only fault I ever had to find with him was that he was too decent.

Mr. J. D. O'Sullivan—I would give him a chance for another year.

Mr. M. Howard concurred.

Mr. M. O'Sullivan—I propose Mr. Timothy O'Callaghan. He is well known to the most of you. He is a very competent man. He has acted as foreman mason in several large contracts, including the new wing to the Villstreet Convent, and always gave satisfaction. He has been employed by the biggest builders and if you elect him as engineer, I promise you you won't ever regret it.

Mr. D. Lennihan—I second that.

Mr. P. P. O'Connor—I propose Mr. Patrick McAuliffe. He is a very competent

man.

Mr. E. Casey seconded.

Mr. M. O'Sullivan—I propose Mr. Howard.

Mr. P. J. O'Callaghan seconded.

Mr. D. P. O'Leary—I propose Mr. Daniel O'Connor. He is connected with the building trade for the past thirty years, and would make a good man.

Mr. J. J. Hickey—I suppose I will have to go for the Cullen man, too. I second that.

Mr. J. Buckley proposed Mr. James P. Buckley.

Mr. D. O'Connor seconded.

None of the other candidates were proposed.

After many divisions, on a final poll between O'Connor and Howard, there voted for—

O'Connor—Messrs. J. D. O'Sullivan, J. J. Hickey, D. P. O'Leary, T. D. O'Keeffe, P. P. O'Connor, E. O'Riordan,



MR. G. H. FELLOWES PRYNNE, F.R.I.B.A.  
Portrait by permission of the "Stone Trades Journal."



D. Lenihan, D. O'Connor, E. Casey, C. Cashman, and J. P. Hickey—11.

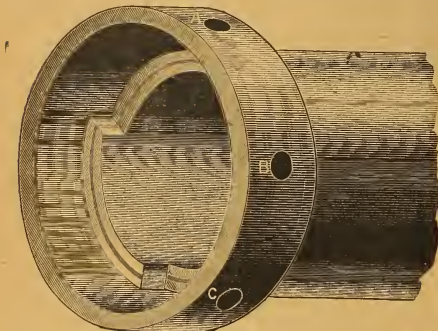
Howard—Messrs. H. O'Sullivan, P. J. O'Callaghan, D. Twohig, M. O'Sullivan, J. Buckley, M. Howard, T. Kelleher, and P. E. Daly—8.

Did not vote—Messrs. T. J. Barton and the Chairman—2.

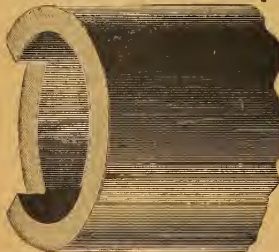
The Chairman then declared Mr. O'Connor elected as engineer to the Council under the Labourers Acts, at a salary of £30 a year, the Council reserving the right of dispensing with his services by giving him one month's notice of their intention of doing so.

## REVIEWS OF CATALOGUES.

**Wakefield's Recess Socket Stoneware Drain Pipe.**—The two illustrations which we give of the spigot and socket of these pipes will give a good idea of the improvement claimed over the jointing of ordinary stoneware pipes. When the spigot is placed in position a true invert is formed, and at the same time a clear annular space is created for allowing the pipe jointer to make the joint easily and effectively in any of the following different ways:—



1. The joint may be made in the ordinary way, i.e., with stiff Portland cement.
2. The joint may be made with cement grout poured through the hole in the socket, either A. or C. and, finally, when sufficiently set, finished by pouring in at the top hole B.



A band of clay must be placed on shoulder of socket and round mouth of socket to hold up the grout while setting.

3. The joint may be made equal to any patent or lined joint by using imperishable jointing, of which particulars are supplied in the catalogue before us.

The following advantages are claimed for it.

It is run with the greatest ease and facility, and can be tested within one or two hours afterwards—a great advantage—while the comparative cost is little more than Portland cement and yarn. The composition is imperishable, sets harder than cement, and is not affected by acids. It is claimed for it that an absolutely sound watertight joint, capable of withstanding a very high pressure, can be made in either wet or dry ground. Full particulars of the pipes and jointing material may be had from Mr. Arthur Wakefield, 39 Victoria Street, Westminster, London, S.W.

We have received from Mr. John Smith, Royal Label Factory, Stratford-on-Avon, his illustrated catalogue dealing with his imperishable labels for horticultural and other purposes, as well as some specimens of the labels themselves. The labels are of a white metal, resembling aluminium in appearance, and the lettering is raised from the surface in bold black-faced letters, so that legibility, and that, too, at a considerable distance, is a marked feature of these labels. They are also constructed with a view to durability, and will last in the most exposed positions for generations, while being at the same time remarkably cheap. Mr. Smith's labels are adaptable to every purpose for which goods of this description can be used. Amongst the samples submitted to us are some intended for nurseries and botanic

gardens, with ground shanks twelve inches long and upwards. The face of these is sufficiently large to contain both the botanical and English name of the plant. Other labels are intended for hanging on trees and shrubs, for numbers on house doors, and packing cases, &c., for numbering graves in cemeteries, and also for nailing to walls to indicate the position of fire hydrants. The labels can, of course, be made with any special lettering for particular purposes, and can be enamelled in colours to order. The workmanship is excellent, so much so, indeed, that the catalogue (which can be had on application to Mr. Smith at the address given above), although excellently produced, does not convey an adequate idea of the beauty of the labels.

From Messrs. Hodgson, Hartley, Ltd., Little Peter-street, Knott Mill, Manchester, two catalogues are to hand. Of these catalogues, "A" is devoted to special machine tools, consisting of a variety of shaping machines, screw and rack planing machines, screwing machines, wheel cutting and boring machines, etc. All the machine tools in this catalogue have been re-designed, improved, and brought up to modern requirements, the workmanship and materials being the best of their respective kinds. The illustrations, which are excellently reproduced, are from actual photographs. The second catalogue is descriptive of the "Brookhouse" Patent Pneumatic Sand Moulding Machine, which is unique in foundry practice, and has many features rendering it especially valuable to foundries in iron, steel, brass or aluminium, whether of large or small output. Some of the more striking features of the machine are illustrated and described in the catalogue, which will be found interesting and useful by all engaged in foundry work.

Messrs. Merryweather & Sons forward descriptive illustrations of their patent "Metropole" fire valves, of which we give two illustrations, showing the general appearance and section of the valve. These valves have now been in use in hotels, mansions and other buildings for about 20 years, and have proved themselves perfectly reliable and durable, being never likely to get out of order. There is no leather or rubber packing box in these valves, but, instead, a cone on the spindle fitting into a coned seat in the cover of the hydrant. The construction is such that leakage is unknown, and no matter how long they may stand unused they never set fast. No iron or steel is used, the whole body of the valve, the spindle and hand-wheel being of the best gun metal, with valve-seat of water-proof material. The "Metropole" fire valves have been so largely used, and have established such a reputation for themselves, that they really require no testimonial from us, and we can strongly recommend them to architects desiring a high-class, reliable fire hydrant. The address of the firm is Messrs. Merryweather & Sons, Ltd., Greenwich road, S.E., and 63 Long Acre, W.C., London.

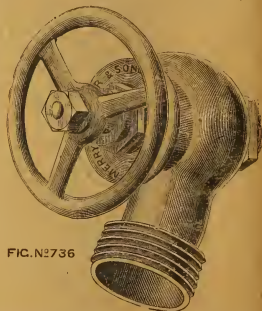


FIG. N°736

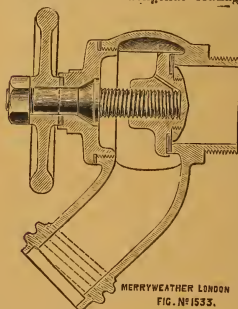


FIG. N°1533.

Greenwich road, S.E., and 63 Long Acre, W.C., London.

A very interesting catalogue is that published by Messrs. Constable, Hart & Co., Ltd., Clarence House, Arthur Street West, London, E.C., who are manufacturers of "Slag Tar Macadam," and "Limestone Tar Paving." The specialties of this firm are of particular interest, now that the advent of the motor car has proved that the roads of these countries are old-fashioned and no longer suitable for the extra strain put on them by the heavy and fast traffic of the present day. It is unnecessary here to set forth in detail the objectionable features of motor traffic on roads as now constructed. They are epitomised in the two words "dust nuisance," which involve not only general inconvenience, but also in many cases monetary loss to the public. The surface of macadamised roads is quite unsuited to the speed of motor cars, which, owing to the suction caused by the rubber tyres, have a disintegrating effect, thus causing excessive dust during the summer months and a sea of mud in the winter.

The clouds of dust also cause serious depreciation in the value of house property alongside main roads, and detriment to health by the circulation of dust particles in the atmosphere. In seeking for a remedy most authorities have arrived at the conclusion that the use of some form of "Tar Macadam" offers the best solution. This material is non-porous, adhesive, and not much dearer than ordinary macadam when laid in large quantities. Messrs. Constable, Hart & Co., after a long series of experiments, have succeeded in producing two paving materials, of which tar is a constituent. The first, "Slag Tar Macadam," intended for roadways, and the second, "Derbyshire Limestone Tar Paving," for public footpaths, school playgrounds, tennis courts, and similar purposes. The catalogue to which we refer deals fully with both of these materials, giving illustrations of the various works of the company, and of a number of roadways which have been treated. Much useful information on the subject of modern road-making is also embodied in this publication, which can be had on application to the company at above address.

**Messrs. W. C. Gibson & Co.**, 5 and 7 Old Queen-street, Westminster, London, S.W., send an illustrated leaflet descriptive of their patent "Krator" and "Helios" sinks. The "Krator" sink is a combination of lavatory basin and sink. With the plug in, a wash-bowl is formed, whilst with the plug out, it is used as an ordinary sink. The adoption of this arrangement would frequently mean the saving of expense where a separate lavatory and taps and waste would be fixed. On the other hand, where no lavatory would otherwise have been fixed, it provides one at an exceedingly small increase on the price of an ordinary sink. In flats, workmen's dwellings, for the nursery, etc., the arrangement should prove very valuable. The "Helios" sinks, of which there are two patterns, are a combination of the ordinary sink with a draining ledge. Under the old conditions soapy brushes, dish cloths, etc., had no place, whilst in this sink they rest upon the clean glazed ledge provided. In washing plates, etc., the ledge is also particularly useful, the articles being placed therein to drain. These sinks have a centre outlet. The ledge is also used on a variety of other patterns, particulars of which will be provided on application. All these sinks are made in leadless glazed freiday of best quality, all buff, all white, or buff out and white in.

From **Messrs. Spong & Co.** we have received illustrated particulars of their patent lawn sprinklers, to which they have given the name of the "Summer Shower." These sprinklers are constructed on a very ingenious principle. The water is conducted through a vertical stand pipe, through the top of which it issues in fine jets. Immediately over the jet is fixed on a spindle an inverted cone fitted with projecting wings. The water striking vertically on the cone comes in contact with the wings, and causes the cone to rotate rapidly, breaking the jets into a fine spray like rain, which is thoroughly distributed over the turf within a circle of 20 to 30 feet diameter, according to the water pressure. The sprinkler is fitted with a spike, but patterns are also made with a stand, so that they may be drawn along the lawn. The address of the firm is 93 High Holborn, London.

### ENGINEERING NEWS.

**Athy.**—The Local Government Board have written to the Urban Council giving their sanction to the permanent employment of Mr. J. Coleman as Town Surveyor.

**Birr.**—The confirming order for the Birr Waterworks has received the Royal assent, and the detail plans for the work are being prepared by the engineer for the scheme, Mr. F. Bergin, B.E., 36 Westmoreland-street, Dublin.

**Balrothery Rural District Council (BALBRIGGAN SEWERS).**

—The Secretary, Local Government Board, wrote stating that the Board had before them the report of the Balbriggan Public Health Committee, adopted by the council at their meeting on the 11th ult., relating to the amended scheme proposed in connection with the sewerage of Balbriggan, in respect of which a loan of £2,000 is required; also the plans, specification, etc., in relation thereto, which were furnished to the Board by Mr. C. M. Tuite, C.E. It appears that in the scheme now submitted the Council propose to retain the existing outfall for the general volume of the sewerage—a proposal to which objection has already been made by the Dublin Port and Docks Board, and that the provision of a suitable alternative outfall for the works has not been fully considered by the Council. Having regard to this, the Local Government Board state that they are unable to alter the views expressed in their letter of the 8th November, 1904, on this matter, and they consider it desirable that the Council should obtain the advice of the solicitor in regard to the legal points involved in connection with the scheme as now

proposed. The Council would do well, at the same time, to obtain the services of a consulting engineer who has devoted special attention to the execution of sewerage schemes, in regard to the provision of a suitable outfall for the sewerage in this case. The letter was referred to the local Public Health Authority.

**Castlereagh (Belfast).**—The Rural District Council of Castlereagh, have secured the services of Mr. J. H. H. Swiney, M.Inst. C.E., of the firm of Messrs. Swiney and Crossdale, of Belfast, to advise as to the disposal of the sewage of a part of the district in the suburbs of Belfast.

**Carlow.**—The County Council of the County of Carlow will, at their meeting to be held on the 3rd proximo, appoint a duly qualified person to the office of Assistant County Surveyor, at the yearly salary of £80, to cover all expenses.

**Dublin.**—Mr. F. Bergin, of 36 Westmoreland-street, Dublin, who was appointed some time ago to examine and report on the site and plans for the new storage reservoir, which is to supplant the existing reservoir, that very nearly failed during the dry year 1894, has been busily engaged at Roundwood for the past month. He has submitted his report to the Waterworks Committee, when a special day was fixed for its consideration.

The Dublin Corporation are open to receive tenders, up to September 8th, for the supply of arc lamp pillars and arc lamps.

The huge lifts for the new Argyll motor works, Dublin, are to be constructed by the National Electric Construction Co., Nassau street, Dublin, who have just secured the contract. These lifts, as well as all the machinery, will be driven by motor supplied from the Corporation mains. The building was designed by Mr. F. W. Higginbotham, A.M.I.C.E., 9 Lower Sackville street, Dublin.

**Dalkey.**—The Dalkey Urban Council are about to obtain tenders for the erection of a weighing machine in their yard.

**Dunmanway (Co. Cork).**—Dunmanway Rural District Council will, on 4th September, appoint an engineer to prepare plans, specifications, and estimates for the proposed lighting of the town of Dunmanway by means of acetylene gas.

**Swinford.**—The Board of Guardians of Swinford Union received tenders for supplying and fitting six laundry troughs for use in the Workhouse Laundry.

**Trim.**—The confirming order for the Trim Waterworks has now received the Royal assent, and steps are being taken to have an arbitration appointed at once. Mr. F. Bergin, Westmoreland street, Dublin, is the engineer.

**Wexford.**—The Co. Council will hold a special meeting on 24th inst. to appoint assistant surveyors.

**Warrenpoint.**—The new Orange Hall has been opened. It occupies a commanding site in St. George's Street. The building, which is built in easy Renaissance, is furnished in pebble dash, with cement facing. It stands in grounds with a frontage of 50ft., the building itself running back 42ft., with a frontage of 36ft. The builder was Mr. Copeland, Belfast. Mr. Charles Brown, Newry, executed the plumbing and gasfitting, while the painting was done by Mr. John McOrum, Newry. Mr. S. W. Reside, Newry, was the architect.

A special meeting of the Warrenpoint Urban Council was held on the 10th inst. The meeting was convened for the purpose of appointing a clerk of works in connection with the erection of the new promenade and bathing places. There were twelve applicants, but five of these had been selected and forwarded to Messrs. Kaye-Parry and Ross, engineers, for their recommendation. Mr. A. E. Willbond, C.E., Carrickfergus, was appointed at a salary of £3 per week and certain expenses, this being the suggestion of the engineers. Mr. Wm. Johnson, solicitor to the council, intimated that £5,403 15s., the amount of the loan, had been lodged in the bank.

The foundation stone of the new public baths, which are being constructed by Messrs. H. and J. Martin for the Urban Council, at a cost of about £4,000, was laid on Monday last. Messrs. Kaye-Parry and Ross are the architects.

### TO CIVIL ENGINEERS.

#### PROPOSED SEWERAGE SCHEME FOR NEWCASTLE, CO. DOWN, IRELAND.

The Urban District Council of the above Seaside Resort invite Applications from Engineers for the preparation of Plans, etc., and necessary supervision for the carrying out of a scheme of sewerage with purification for the Township.

Applicants to state terms, qualifications, references, and experience of similar works to the undersigned on or before the 22nd September, 1906.

DANIEL CURRAN,  
Town Clerk.



### THE WATER-POWER OF NORTHERN ITALY.

The water-power of Northern Italy is beginning to take its place as one of the main assets of the kingdom by reason of the effect exercised upon industrial development by the diminishing coal supply. In the Italian cotton trade, the fuel problem, which is rapidly advancing to a serious stage throughout Europe, is rendered scarcely of moment, through the rapid development of electrical energy generated by water-power in the hills. All the newer cotton mills are run electrically, and many of the older ones are to be re-equipped with the same system to take the place of their steam plants. According to the American Consul at Milan, the outlook of the Milan cotton manufacturer upon the future is not clouded by any doubts of his ability to compete with the mills of other countries on the score of power cost. One of the problems connected with the more extended use of water supply in Northern Italy has been suggested by the danger that too much of the natural flow might be made use of, to the detriment of the inhabitants of the upper valleys, who need a considerable amount for irrigation. This difficulty has been avoided by a storage system which appears to be working successfully, and by means of which all interests seem to be cared for equally. One of these reservoir groups was established in 1889, and two storage basins were built with a combined capacity of 5,750,000 cubic metres of water to supply the city of Genoa with water and electric power. The company has resolved to re-equip its works and to bring them up-to-date, and to produce a total available power supply of 6,000 horse-power. Another company, which is exploiting the water supply of the Apennines has established plants at four points in that range. One of these stations will supply electrical power to Spezia, the principal military port and maritime arsenal of Italy, and the other three will be used to transmit electrical power into Genoa. These three stations have a capacity of 28,000 horse-power, and the storage reservoirs for water have a combined capacity of more than 30,000,000 cubic metres. Impetus has been given to water-power studies and electrical transmission by the news that the Italian Government, under the direction of the King, whose interest in such practical enterprises is notably keen, will invite the two principal railway companies in Italy to devote a large part of 1907 to the question of electrical traction, and to take up various projects for trials on a large scale. On the line of the Mediterranean Company there has been tried a third rail system for use in the service between Milan and lakes Maggiore and Lugano. After three years this appears to have given satisfactory results. In Northern Italy, nearly all the small cities and a large number of villages are supplied with electric light, while many of them have installations of hydro-electrical power. Among the cities of from 10,000 to 50,000 inhabitants, so equipped, are Vercelli, Novara, Pavia, Bergamo, Brescia, Verona, Voghera, Mantua, Vicenza, and Intra. Hydro-electrical installations have played a powerful part in the commercial advancement of these cities. The city of Como, one of the principal silk centres of Europe, draws its electric lights and power from a station near Porlezza, on the Lake of Lugano, through a wire line twenty-seven miles long and at a tension of 2,000 volts. The station includes a canal and tunnels, 11,000 feet in length, by which is utilised a typical mountain torrent with a fall of 835 feet. The station contains five groups of generators. The town of Lecco, distinguished for its manufacture of cheeses, takes its electric light and power from a water-power fourteen miles distant. The installation at Verona is slightly different from these others, as in that city there exists a canal for industrial purposes, with a fall of about 35 feet, which supplies a considerable number of factories. A part of the power in this canal is utilised to generate a triphase current at a tension of 3,000 volts, supplying about 1,000 horse-power, which is distributed to small industries in the city at an average consumption of 35 horse-power each. Conditions at Vercelli, Novara, and Pavia, all commercial centres of tributary importance to Milan, are closely analogous to those at Verona. The city of Brescia, with 67,000 inhabitants, in the upper Lombard district, is served by two hydro-electrical installations, and a third will soon be put into operation, and will embody

the latest inventions and appliances for this sort of work. The station is at Ponte Caffaro, in the Giudicaria Valley, where there is obtained a fall of nearly 850 feet of water. About 10,000 horse-power will be supplied from this station. Bergamo, another of Lombardy's most enterprising small cities directly connected with the commerce of Milan, has several small stations which take advantage of water-powers in that vicinity, giving the city a total of 3,500 horse-power for industrial uses, transmitted in triphase currents at 7,000 volts. Apart from these installations, which serve the smaller cities, there are a number of others in Northern Italy which supply electrical power to groups of villages spread over a territory more or less extended. Throughout Lombardy important manufactures are depending more and more upon electrical transmission for their power, and everything like a complete list would be a very long one. One of the most interesting plants is at Gromo, noted as the first in Italy to use a current of 40,000 volts. The wire line supplies the Crespi textile mills at Nembro. Many others might be mentioned—for example, the great textile mills at Schio, Melegnano, Novara, Udine, etc., are all worked in this way, and every year sees electrical transmission developing towards the point where all the rich country centring on Milan will be rendered independent of diminishing coal supply and the increasing high cost of fuel. Of vital importance in any complete consideration of the water-powers of Northern Italy, as related to the industrial development of Milan, is the plan now well on foot to add 40,000 horse-power to the available motor-power which can be drawn upon by manufacturers in the city. This plan comprises the use of the waters of the Adda River, which leaves the Lake of Lecco at the city of Lecco

Messrs. McGrath and Sons, of Belfast, have just completed a new power-house chimney for Messrs. David Allen and Sons, Ltd., at their printing works, at Harrow.

### QUEEN'S COLLEGE, GALWAY.

SESSION 1906-1907.

### DEPARTMENT OF ENGINEERING.

### ENTRANCE EXAMINATION.

19th OCTOBER, 1906.

The Matriculation Certificates of the Queen's Colleges, Belfast and Cork, and of the Royal University of Ireland, and of other Universities within the United Kingdom, are accepted by this College.

All Lectures, Scholarships, Exhibitions, and Prizes are open to Women.

### JUNIOR SCHOLARSHIPS.

First Year—Two, value £20 each. Second Year—Two, value £20 each. Third Year—One, value £20.

The Examinations for Scholarships of the First Year will commence on the 24th October, of the Second Year on the 19th October, of the Third Year on the 22nd October.

### EXHIBITIONS.

The Council may award Exhibitions to Students at the Examinations for Junior Scholarships.

Scholarships and Exhibitions are tenable for One Year, and Candidates must have Matriculated.

Lectures can be attended by both Matriculated and non-Matriculated Students, and all Lectures, Scholarships, Exhibitions, and Prizes are open to Women.

Information as to Fees, and Copies of the Prospectus may be had on application to the Registrar.

By Order of the President,

EDWARD TOWNSEND,

Registrar.

1st August, 1906.

# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,  
ARTS AND HANDICRAFTS.

Every Second Saturday.

[Estab. Jan. 1859.]

No. 18—Vol. XLVIII.

HEAD OFFICE

SEPTEMBER 8, 1906.

34 LOWER ABBEY ST.,  
DUBLIN

Price 1d.

## TOPICAL TOUCHES.

The Art Exhibition at the Horse Show was hardly so representative or important as during the previous couple of years.

\* \* \* \* \*

Miss Purser's "Tower o' Glass" works exhibited some very nice lead lights, made from Irish bottle glass, for Spiddal Church, Co. Galway, to which we made reference last week.

\* \* \* \* \*

The "Tower o' Glass" also showed a very fine stained glass window, the figure and subject of which—St. Michael—is a really good piece of drawing, colour, general design and execution; the glowing tints are rich and effective, as different as day is to night from the hideous painted transparencies of Munich and Belgium.

\* \* \* \* \*

Miss St. John Whitty exhibited a very fine carved wood bishop's throne, the design being good and the workmanship most excellent. It was about the best exhibit of the entire collection.

\* \* \* \* \*

The brass work, though good in workmanship, was extremely poor and commonplace in design, some exhibits being the ordinary stock patterns of the shops, and others amateurish.

\* \* \* \* \*

A Kilkenny man, Mr. John Kelly, has been declared successful contractor for the important Clontarf main drainage, the tender for the sewers and other works which comprise the contract amounting to £46,631 5s. 8d.

\* \* \* \* \*

Mr. J. F. McCabe, one of the Inspectors of the Local Government Board, has furnished his Board with a report on the Letchworth Cottage Exhibition, which he visited at their request. Mr. McCabe points out that the provision of a simple, healthy cottage, at a cost of £150, has never been a problem in Ireland; that the Letchworth Exhibition did not show any cottages which could be built for that sum; and finally, that the cottages exhibited were more like desirable villa residences than labourers' dwellings. In fact, as we stated at the time, the Letchworth Exhibition contributed nothing to our knowledge of the subject.

\* \* \* \* \*

Mr. James K. Boulton, architect, aged 24, of Slade Road, Gravelly Hill, met with a shocking death at New Street Station last week. He travelled to Birmingham by the train from Evesham, which is timed to reach New Street Station at 3.30, and attempted to alight before the train stopped. In doing so he slipped and fell between the footboard and the ledge of the platform. He was dragged some yards, whirled round and round, and was crushed in a horrible manner. His heartrending cries of agony attracted the attention of numerous passengers, but they were powerless to save him. So tight was the unfortunate man wedged between the platform and the step that levers had to be brought to prise up the footboard before his mutilated body could be released. When extricated he was still alive, but he died on the way to hospital.

The Royal Hibernian Academy have had a rare "find" in their cellars. The other day two old masters were unearthed, and are now on view. The pictures must have lain hidden away for very many generations.

\* \* \* \* \*

The order for the wood block flooring of the new Church at Claremorris has been secured by Mr. J. F. Ebner, of London, through his Irish Agent, Mr. W. J. Shaw, Belfast. The flooring will be carried out in selected  $1\frac{3}{4}$  in. deal, and maple blocks with teak borders.

\* \* \* \* \*

It is proposed by the Kinsale District Council to erect some 105 labourers' cottages. It is estimated that the average cost, including half an acre of land, will amount to £240 per house, which certainly seems a very excessive price, considering that the average value of half an acre of land in rural districts in Ireland seldom exceeds £25.

\* \* \* \* \*

A memorial to the late Alfred Waterhouse, R.A., was unveiled the other day in Yattendon Church. It is a tribute to the life's work of a great architect by some of his old pupils and friends. Yattendon Court, which Mr. Waterhouse built as a residence for himself, is an extensive mansion, and a good example of Waterhouse's domestic work of thirty or forty years ago.

\* \* \* \* \*

The City Architect has been commissioned to prepare designs for the new North City Technical Schools in Bolton Street, and the Law Agent to the Corporation is about to complete the necessary legal formalities in reference to title, etc.

\* \* \* \* \*

We are quite sure Mr. MacCarthy, the City Architect, does not desire this task, which is a burdensome one to a busy official, and it is wholly contrary to the interests of the citizens that a competition should not have been instituted. In a parallel case the other day the Dundee Institute of Architects sent a deputation to the City Council vigorously protesting against such a work being entrusted to the Corporate officials. The protest will, we believe, result in a competition being held, an example which Dublin might, with advantage, follow.

\* \* \* \* \*

We regret to learn that the acoustic properties of the Council Chamber of the fine new City Hall in Belfast are alleged to be very defective. The first meeting was held on Monday; it was soon found that the Councillors could not follow the speakers. The press gallery was soon deserted, as the reporters could not follow what was said; and the press representatives ranged themselves alongside the Lord Mayor's chair, but this also was useless. This is most unfortunate, but the architect can hardly be blamed, as, despite much theory and research, the question still remains one more or less of chance. We trust, however, that means may be found to remedy the present state of affairs. New halls frequently have bad acoustic qualities owing to echo, excessive resonance, arising sometimes from emptiness; the introduction of more furniture and fittings, or strained wires, hangings, etc., sometimes remedying this state of things. Possibly in this case the defect may be due to the Council Chamber being rather large and lofty for the comparatively limited numbers of the Council.



## WHERE THE MASTERS WROTE.

(Paper read before the Belfast Naturalists' Field Club by

WILLIAM J. FENNELL.

Member of the Royal Irish Academy, Fellow Royal Institute of Architects, Ireland; Fellow Royal Society of Antiquaries of Ireland.

One can readily understand that the place where the Masters wrote is inseparably welded with the History of Ireland, and this year (1906) the writer bent his steps towards it to make a record of the little that is left of that once prosperous Religious House, before that little vanishes away for ever. Picturesquely lying on a gentle bend formed by the Eask River as it winds down from its source, a lonely lake in Donegal, and meets the tidal waters of the estuary from the Atlantic, are a few hallowed stones, the sole remnants of a monastery round which should cling for ever loving memories and deeply cherished reverence. There is a halo of peaceful glory and the tranquility of age quietly spreading over the broken arches and crumbling gables as with an air of dreamy pathos the ruin seems to gaze towards the setting sun over a scene which looks like an enchanted dream—waters with verdant banks and clustering islands, rich with manifold colours, glistening in reflected rays of light—and peaceful beyond expression.

Such was once the ideal site selected by an Irish prince for the followers of St. Francis of Assisi on which to found their home, and back to those well loved but crumbling walls crept in perilous times of devastation and cruelty the Four Masters—time honoured monks—to write a history that a nation might well be proud of.

When we remember the associations that must for all time linger around this old ruin it seems marvellous to us—and almost beyond conception—that the inhabitants of Donegal could rest satisfied in a sleepy apathy of thorough indifference, almost amounting to contempt, for what should be revered and cherished by them more than by all others.

A committee of the local inhabitants, by means of a small annual subscription of half-a-crown or five shillings a head, could have kept these walls in preservation; yet so thoroughly dead are they to the fact of possessing at their door a great treasure that during the past year the east gable has been allowed to fall in, carrying with it the head of the east or sanctuary window, and not a hand stretched out to save it!

Had we seen, as we entered, a noble Celtic Cross richly worked in the chastely subtle beauties of our native art erected to the memory of Michael O'Clery, and then come on a ruin cared for and preserved with the same love and protection that so distinguishes the great monastic ruins of England, we would not have been surprised. We do not look for restorations, but we expect—we had almost said we demand—preservations, and in their stead we find neglect and desolation that is positively degrading.

It is now over two centuries and a-half since the "Four Masters" completed their labours, and ever since then the site seems to have been a general burying ground, and while we honour the desire to repose in such hallowed earth, we regret the uncontrolled scramble for every inch of it which has thrown up the soil into shapeless and unkempt mounds—in some places to over four feet above the original level of the floor line.

Under this floor line, most possibly in the sanctuary, were laid to rest the remains of some of Ireland's princes and illustrious great.

First in honour was the founder, O'Donnell, who died in 1505, whom the Masters describe as "the full moon of hospitality and nobility of the north, and the most eminent for agreeable manners, feats of arms, the best man for either peace or war, and the most distinguished of the Irish in Ireland in his time for Government laws and regulations, for throughout Tírconnell during his time no watching was kept, and the people only closed the doors to keep out the wind." He also erected the first Castle in Donegal. Here also rested Murrough O'Brien, Baron of Inchiquin.

This Irish nobleman joined the English and led the attack on Ballyshannon in 1507—and "on his horse outside the soldiers, he was in the centre and in the depth of the river, protecting them from being drowned, and encouraging them

past him, but fate ordained that he was directly aimed at by one of O'Donnell's men by a shot of a ball at the separation of his mail armour in the arm pit—and it passed through the other arm pit; he could not be helped until he fell from his horse in the depth of the stream and was immediately drowned." We notice here how the "Masters," in the greatness of their generous natures, could pause to praise an enemy, and they proceed to relate how much he was mourned by all.

The body was recovered after the defeat of his force by the Cistercians of Asseroe near Ballyshannon, and buried by them in their monastery, but the Franciscans of Donegal claimed it "because it was in the monastery of St. Francis in his own country that his ancestors were buried;" finally they made good their claim, and after three months the body was exhumed and reverently placed to rest. How long these noble remains rested it is not for us to say, but with the floors rooted out and strangers burying in every available place—both inside and out—they may have mingled with those of many a humble brother owing to the constant disturbance of the place. Possibly the unburied portion of a skull, which we accidentally crushed under foot in this neglected God's acre, may have roofed "the palace of the soul" of one of the truly great. We hope that ere long the grave may again yield them that quietude which is nowadays associated with it.

So much has this abbey suffered from contending armies and careless people that its ground plan is almost blotted out, and it is with great difficulty that portions of it can be traced with any degree of certainty. Still we went to work to survey it, with the hope that our efforts might lead to some attempt to save what little is left, if not by local energy—if any such can be still found in Donegal—then by the Board of Works.

This monastery was founded for the Franciscans of Strict Observance in the year 1474 by Hugh Roe, "The Great O'Donnell," son of Nial Garve O'Donnell, Prince of Tírconnell, and by his wife Fíone-Ualla, daughter of Connor-na Srona O'Brien, Prince of Thomond, and by them dedicated to God. It flourished till 1601, a period of 127 years—short for monastic existence—but full of life and vigour, the brethren following the footsteps of St. Francis—for good works to the poor first, and all others after—and when the final storm swept over it, with fire and merciless hatred, more than one thousand victims perished miserably in its destruction (Doherty). This occurred in 1601 when it was invested by the English.

The brethren fled on the approach of the hostile forces—some to die in the wilds of Donegal; some by sea to distant lands, where Irish colleges offered them asylums and the repose which was denied them at home. The monastery was plundered of all it held sacred and converted into a garrison, only to be destroyed by an explosion of the powder stored by the troops, which wrecked the buildings and dealt death broadcast. In this the Irish mind traced the hand of God chastising.

The Masters record that the powder ignited "so that it burned the boarded chambers and the stone and wooden buildings of the entire monastery." That part of the establishment should consist of wooden buildings is not to be wondered at. Such exist even in these days, and under circumstances where stone and mortar can more readily be obtained than in 1601.

With the famous flight of the Chiefs of O'Donnell—degraded, as some said, to the rank of English Earls—came the Plantation, and this great centre of religious thought and teaching became a thing of the past; but no persecution can extinguish a monk's love for the cloister and its seclusion, and if many wandered back to linger beside it or look at its old walls who can blame them?

The writer has seen many Franciscan monks wander back to say mass in old neglected ruins of their Order with that true love which time, adversity, and trouble have only made deeper and stronger. Can we then wonder that the Four Masters, in the evening of their lives, also turned their faces to the most perfect spot on earth in order to complete their last and greatest work?

This monastery does not seem to have been affected by

the dissolution, as its destruction was in 1602, in the reign of Elizabeth, up to which date it was occupied by the Order.

At this time the O'Donnell Chief was in Spain seeking the assistance of Philip III. to restore his fallen fortunes. He died on the 10th September, 1602. The changed condition of the loved Tircconnell following upon his death is best told in the Masters' own words:—

"Mournful was the condition of the men of Ireland after the death of O'Donnell, for their energy and spirit was broken down; they exchanged their courage for cowardice, their greatness for weakness of mind, and their pride for servility; their success, bravery, valour, chivalry, triumph, and battle sway forsook them after his death; they gave up all hopes of relief, so that the greater part of them were obliged to seek refuge amongst enemies and strangers, while others of them were scattered and dispersed, not only throughout Ireland, but through foreign countries, in general as poor, indigent, wretched wanderers; and other parties of them sold their military services to foreigners, so that immense numbers of these freeborn, noble sons of the men of Ireland were slain and destroyed in various distant foreign countries and strange places, and unhereditary graveyards became their burial places in consequence of the death of that one man who departed from them—Red Hugh O'Donnell."

This Prince was only 29 years old when he died, and under the chancel floor of the Monastery of St. Francis, at Valladolid, he found a more peaceful grave than his ancestors did in turbulent Donegal; even though, as the Most Rev. Dr. Healy, Bishop of Clonfert, says, "it was far, far away from the dear old abbey by the sea at Donegal, where his fathers sleep."

It is, as we have said, difficult to make anything like a perfect ground plan of the monastery, but what we have done shews that owing to the nature of the site, which seems to have been limited on the south for some reason, the buildings hugged the line of shore, thereby placing the cloister-garth and some of the more domestic buildings on the north and west sides.

The church proper was perfectly oriented and lighted from the east and south side.

The east window was tall, well proportioned, and was filled in with tracery, the two top stones of which are now thrown into the piscina, which is on the gospel side of the east wall, and it too is also half destroyed. The sill of this window has been "removed," and since the fall of the arch the ope forms a convenient "hole in the wall" for people who should be the custodians to walk through, a more convenient and easy mode of entrance than by going round to the old door of the cloister, or the Prior's door that leads to the sanctuary. Following the usual Franciscan rule, the church appears to have been long and narrow, over 130 feet by 22 feet 4 inches, with a long transept of about the same width on the south side. No trace remains to indicate the existence of the usual graceful tower which generally rose from the centre of these churches, dividing the nave from the chancel. So far as we can judge, the plan in this case was forced to depart from the special rule by the limitations of the site. The north wall of the church is broken at about 45 feet from the east end, leaving a gap of 37 feet, the width of the garth, and against this gap was the south cloister, covered with a lean-to roof abutting on the church wall. At the point where the break commences in the north wall, the east cloister starts at right angles to the church, with a walk 7 feet 6 inches wide. This walk was covered by a range of buildings extending northwards and eastwards, lineable with the chancel gable. These must have comprised the Slype, Sacristy, Chapter House and Scriptorium, for it is stated that the monastery contained a fine library. The cloister continued its walk on the north and west sides and completed the rectangle. At the broken point of the church wall, just referred to, the latter is thickened to contain a staircase which, starting from the south-east corner of the cloister, leads to the dormitories, etc., over the east range of buildings, and from the Slype was the Prior's door, which still remains. It is reasonable to conjecture that the church had an additional entrance for the brethren from the south cloister; but all other evidences of doors to the church are completely lost. At the south-west angle of the cloister the wall again thickens, and holds a pair of chambers, one over the other, which may have been stores. These are sometimes referred to as the "murder holes"—a contemptible expression—and we have yet to learn that the Franciscans were an Order of Murderers. Another wild fancy is the existence of a subterranean passage connecting the abbey with the castle; but this mysterious means of communication has been suggested so many abbeyes, and never having found such

a passage yet, we are not inclined to believe in its existence. The wall of the cloister on the extreme north also shews evidence of a two-storey range of buildings, but it is purely conjectural as to what filled up the ground on the east side of the walk. We have at least a door from it, and close beside it a porch of peculiar plan, containing the commencement of two staircases, and a door, placed on the angle, leading down to some domestic building, and adjoining it is the old open sewer, still in working order, discharging under a modern wall into the Eask. The details of the architectural work are nearly all gone, and the cloister arcading is the only piece of any importance left. There is a series of well shaped and double chamfered pointed arches springing off semi-octagonal doubly worked piers, whose section is carried round the arch, and whose caps and bases are skilfully moulded. Larger arches seem to have spanned the junction of the cloisters, of double orders, the inner one springing off well worked corbels, and the cloisters are wide and well-proportioned. Such are now the dim outlines of the fast disappearing walls beside which, in 1632, Michael O'Clery and his companion workers built their temporary huts in which they lived till August, 1636, while they compiled the "Annals"; and one can almost picture these venerable Fathers working in the old falling cloisters for four years, and the melancholy scene of their departure from it and one another in the autumn evening when all their work was done.

It is not our intention to enter here on a description of the "Annals of the Four Masters" or the other works of these men—those who wish can read the histories for themselves, and the originals can still be seen in the Royal Irish Academy in Dublin. The Masters called their work "The Annals of the Kingdom of Ireland," but Colgan, a Donegal Franciscan Father and Professor at Louvain, re-named it the "Annals of the Four Masters," by which title the composition will be for ever known.

With the Abbey of Donegal is inseparably linked the Irish College in Louvain in Belgium, and no description of the place where the Masters wrote could be perfect without a reference to it, and no visitor to Donegal Abbey can leave those historic ruins without turning his thoughts towards this venerable and hospitable retreat of learning, as O'Clery did on that August evening in 1636.

The University of Louvain contained no less than fifty colleges, one of them being for Irish Franciscans. (This was one of the five colleges set apart for the Irish Franciscans on the Continent.)

We mentioned that Hugh Roe O'Donnell went to Spain to seek military assistance and died there. He took with him one Florence O'Mulconry. This Franciscan was with Hugh when he died, and to him the Irish College at Louvain owes its existence. He was appointed Archbishop of Tuam in 1608, but never visited his diocese; this, however, was not a usual procedure, but still such cases are not entirely unknown. We have read of an Archbishop of Armagh who never saw his diocese. Mulconry died in 1629 in Spain, and his remains were transferred to Louvain and buried on the gospel side of the altar. Another great Irishman was Father Hugh Ward, a man of great research and deep learning, and who, shortly after the foundation of Louvain College, became its guardian. One day a man, well advanced in life, and knowing no Latin, knocked at the College gate and humbly requested Ward to admit him as a lay brother. This poor wanderer was no other than the high-souled Michael O'Clery—the Irish "Ollamh"—one of a family of historians and poets to the great Princes of O'Donnell; but if he knew no Latin he was well versed in Irish lore and literature, and his abilities soon became apparent to the scholars of Louvain. Ward obtained permission to employ him to collect materials in Ireland for him, and this brought him back as a Franciscan to his native land, where he laboured to gather together the archives required, and one can now only with great difficulty realise his task of journeying from one end of Ireland to the other in such times and amid such dangers. While on this mission for Ward he conceived the idea of collecting and compiling the "Annals," "for the glory of God and the honour of Erin," and we have told how and where he completed this noble work. In this labour he was assisted by Fergus O'Mulconry, Peregrine O'Duigenan, and Peregrine O'Clery, and Conary O'Clery as Secretary.

The College lasted till the French took possession of Belgium in 1796, and the building is now an Industrial School in care of Les Freres de la Charite de S. Joseph. Michael O'Clery, an old man when his work at Donegal was done, wandered sadly back to the peaceful college of Louvain to die, and there in 1643 he was laid to rest; but there seems to be little repose for the Irish Franciscans of



that period even in the grave, for Louvain had its troublous times also, and O'Clery's grave became lost in the upheaval and confusion.

Such briefly is the place where the Masters wrote—where the greatest history of their country was compiled with unequalled indomitable perseverance and under pressing difficulties—in hunger, poverty, and amid desolation; but amidst a scene of such natural beauty, that in its quietude and splendour it seemed as if it had known no trouble or evil. Before we left it we recalled the words of a great man who said, referring to another famous Irish settlement, "to abstract the mind from all local emotion would be impossible if it were endeavoured, and would be foolish if it were possible."

"Whatever withdraws us from the power of our senses, whatever makes the past, the distant, or the future predominate over the present, advances us in the dignity of human beings."

"Far from us and our friends be such frigid philosophy as may conduct us indifferent and unmoved over any ground which has been dignified by wisdom, bravery, and virtue."

### HEATING BY HOT WATER.\*

Nowadays it is only in comparatively small private houses that we find the old-fashioned open fire grate, exclusively relied upon for heating purposes. In houses of any magnitude, there is usually an auxiliary system, while in the various classes of public buildings and larger commercial structures, we generally find the old system superseded by some one or other of the many varieties of hot-water (high and low pressure), steam, hot-air or the plenum system. Each of these have their advocates, and each possess certain advantages for particular cases. The fashion has run practically a cycle through them, beginning with the low-pressure large-bore system, on through steam, hot-air, high-pressure water, the "plenum," and finally, we are now back to low-pressure hot-water heating, as a perfectly up-to-date method—with the difference, as we note above, that it is now recognised that all these systems are capable of satisfactory use under present-day conditions and requirements. Of all the systems in vogue hot water, either high or low-pressure, is most generally regarded as an economical and convenient method for the average case.

The book written by Mr. Walter Jones, of the well-known firm of heating and ventilating engineers, Jones and Atwood, is confined to the consideration of this latter system; and the fact that it has run into a third edition seems to warrant the assumption that there was distinct need for such an addition to the literature of the subject. The architect nowadays has, perforce, to deal with such a multiplicity of special subjects, not, strictly speaking, part of the ordinarily accepted details of his profession, for he is, or should be, primarily a designer of buildings and of their furniture, decoration, gardens, and other essential adjuncts, his function ought to be, in the main, of an artistic nature. The innumerable other questions which arise of an engineering or scientific nature, must, however, be dealt with in some form or another. The difficulty has been met in two ways. In America far more is expected of the architect than in England: he must be master of every detail and of every branch. Obviously this is beyond the power of one man's brain, so the modern architect becomes practically a grand director or superintendent of a systematised and specialised staff, to the detriment of his artistic powers, and involving the loss of that personal quality or stamp which redeems the best modern architecture from pure commercialism. In England, and still more in this country, the matter is met by leaving such details as heating and lighting, very much in the hands of the various contracting firms, who each have their speciality to recommend. Occasionally the "Consulting Engineer" is introduced, and he works in conjunction with the architect. There is no doubt that this latter system is the ideal one, but it is, under present conditions, not always available. The architect, therefore, must strive to attain as large as possible a knowledge of very diversified subjects. None is of more every-day importance than heating, and so Mr. Jones' book is bound to be of real value. He gives a large amount of very useful information, beginning with a statement of the advantages of the high-pressure system, he tells us that it has been in use for upwards of 65 years, and that compared with low-pressure work, the improvements effected have been small. For ensuring very high temperatures up to 500 deg. Fahr., it is incomparable. For

moderate temperatures it is cheap, but has the defect of causing an unpleasant burnt odour, and an unpleasantly dry heat, sometimes resulting in headaches, etc. Low-pressure hot-water heating, has, for ordinary temperatures, the greatest advantages, and such is our own experience; it costs a little more, but is worth it, while for exceptionally large and scattered buildings, and particularly "skyscrapers," Mr. Jones believes in steam heating.

Mr. Jones gives many practical details, and tables relating to these systems. The system of high-pressure hot water heating is so well known that it is superfluous for us to enter upon many of the details given by Mr. Jones, but he doubts the extreme economy claimed for this system, while the small bore of the pipes renders them particularly liable to be affected by frost. The temperature is, however, quickly raised; it may be readily used to assist ventilation. Speaking generally, it is suitable for use in warehouses, large halls or churches, which are well ventilated, and other extensive public buildings.

Mr. Jones gives many useful tables and formulæ relating to the velocity or flow of water, the laws of heat, etc.; some practical observations on the causes of failure, boilers, and much information of a practical and theoretical character.

In considering the question of the advantages of the low-pressure system, Mr. Jones says, that these are "immense," over all other systems; that is for general use. By its means an equable temperature may be most easily maintained, and the heat distributed and controlled. It is economic in its consumption of coal, and it is simple, safe, and reliable, while the heat is mild and agreeable. So far, those who have had experience of both systems will be disposed to agree with him; but when he goes on to declare that "it may be fixed without skilled labour," and that "its first cost is lower than any other system," he is, we think, claiming a little too much. A heating system fixed without skilled labour does not appeal to one's common sense, while as to cost, our own experience is entirely opposite to what Mr. Jones states, the first cost of a low-pressure system being very considerably over that of a high-pressure one—in Ireland, at all events—but these are only minor points and do not detract from the general usefulness of the work.

In passing, Mr. Jones notes the common fallacy which ascribes the circulation of hot water to "its tendency to ascend on becoming heated." Of course it has no such tendency, properly speaking. The circulation commences, not in the flow-pipe, but in the return pipe, the water in which is heavier than that in the boiler, and consequently forces the hot water, which is lighter, upwards, and so starts the circulation.

Mr. Jones also mentions another fallacy, viz., that if the supply is placed a good height above the pipes it ensures a better circulation, whereas if the cistern be placed simply clear of the highest part of the circulating pipes, it will act equally well, and at the same time reduce the pressure and strain.

Mr. Jones is entirely adverse to the common practice of heating a bath system from a boiler at the back of a kitchen range; he describes it as clumsy, inaccessible, and very wearing on the boiler. He admits it has the advantage of convenience, and we fear it will be a long time before the public will abandon it. For all but the smallest houses he much prefers an independent boiler, with its own furnace, the first cost of which is practically identical, and there is a great saving in fuel, and in wear and tear. However, it seems to us, that whatever be the merits of the separate system for large establishments, it is quite inapplicable to the average small house or cottage.

The work is a most admirable one, and should be in the hands of every architect and engineer; it is full, not merely of practical hints and details of jointing and such like construction, but contains a mass of theoretical information and calculations.

### THE SOUTH AFRICAN BUILDING TRADE.

There is nothing new to speak of in the building trade, and this remark applies with equal correctness to most parts of the country. The reports which come to me from various sources are in many cases certainly not cheerful reading, if they are taken too seriously, but I have a lurking suspicion that things might yet be worse than they are now or are likely to be. Builders should be amongst the last men to grumble at a temporary depression; they have had their good time—and a very good time it was—and they must not complain if they are not asked to tender for little jobs for which, in the good times, they would not even have troubled to make up an estimate!—"South African Architect."

\* "Heating by Hot Water: Ventilation and Hot Water Supply" (Third Edition), with information on the best methods of Heating Public, Private, and Horticultural Buildings, &c., &c. By Walter Jones, M.I., Mee. E. and M.I.H.V.E. London: Crosby, Lockwood and Son, 7 Stationers' Hall Court, Ludgate Hill.

## REVIEWS OF CATALOGUES.

**Messrs. W. H. Horne, Ltd.,** Albion Fibrous Plaster Works, Idle, Bradford. From this firm we are in receipt of a price list and some catalogues illustrative of the manufactures of the firm, and of a number of decoration contracts carried out by them. It is needless to here enter into any description of the magnificent decorative effects which can be secured by the use of Fibrous Plaster, the advantages of which are well known to those of our readers interested in the subject. We may mention, however, that Messrs. Horne, who are specialists in this material, and with whose work we are familiar, have devoted more than ordinary care to the subject. Their catalogues illustrate a great number of artistic designs for Enriched Ceilings, Cornices, Centres, Trusses, Caps, Columns, etc., and the modelling of these is in all cases done by first class artists. In addition to their standard patterns, Messrs. Horne are prepared to execute commissions from architects, and special designs together with an estimate of the cost will be submitted on approval. A good idea of the excellent work done by this firm may be gained from the book of illustrations showing several of the contracts which they have carried out. These comprise work done in hotels, theatres, churches, banks, and other public and private buildings throughout the United Kingdom, including some contracts in Ireland. We can confidently recommend those of our readers requiring Fibrous Plaster Work to communicate with Messrs. Horne, who will forward catalogues as well as estimates and designs on receipt of particulars.

One of the most interesting catalogues that has come to our notice is that forwarded by the **Carron Company**, of Carron, Stirlingshire, dealing with their 18th century Fire Grates. There is probably no company in existence better qualified to offer to the public genuine antique designs of high artistic merit, because the Carron firm have been nearly a century and a half in existence, having been incorporated by Royal Charter in 1773. As may be expected, therefore, the 18th century fire grates illustrated in the catalogue are of a very good class, and are certain to appeal to all who appreciate artistic and rare home decorations. Many of the grates are, in fact, the creations of eminent artists, the designs being from original carvings executed at Carron over a century ago. Amongst these designers may be mentioned William and Henry Haworth, students of the Royal Academy during the presidency of Sir Joshua Reynolds. Their work clearly shows that they were imbued with the artistic spirit of the times in which they lived, showing as it does the influence of the style of Flaxman and the brothers Adams, whose reputation as designers is so highly estimated. The carvings are masterpieces of the carver's art, and recall a period when strict attention to detail, combined with ease and grace, was the aim of every artist and craftsman. Whilst the old-time style of these grates has been strictly adhered to, the general construction has been modernised to meet present-day requirements. It would be impossible for us in the space at our disposal to enter into anything like a description of the beautiful designs shown in the catalogue, which is a veritable work of art, and we must therefore refer our readers to the book itself. We have no doubt that the Carron Company will be pleased to supply it to architects and builders on application.

From the same company we are in receipt of illustrations of some of their interior and register grates, and also of the Carron Electric Radiators. The No. 1 pattern of the last named consists of four powerful electric heating lamps connected in circuits of two lamps controlled by separate switches, and with polished copper reflector in three pieces. The maximum consumption per hour is 1.06 Board of Trade units, and the minimum consumption half that quantity. The glow lamps will burn 1,000 hours without renewal. Illustrations, prices, etc., can be had on application to the Carron Company, Carron, Stirlingshire.

## REVIEWS.

"The Design of a Tall Chimney, by Professor Charnock, A.M.Inst.C.E." This is a reprint in pamphlet form of a most interesting and useful paper which originally appeared in the "Engineering Times." The author, very properly, points out that in thickly populated manufacturing districts the safety of factory chimneys becomes a matter of the gravest importance to the owners, and occupiers of adjoining property. It is true that accidents are rare, but when they do occur, the results are invariably disastrous, as witness the fall of a chimney in Bradford in December, 1882, when 54 persons were killed and 250 injured; or at Cleckheaton in 1892, when the death roll was fourteen. Notwithstanding such warnings it is, in the opinion of Professor Charnock, to be feared that tall chimneys still continue to be erected without due regard being paid to the question of their stability, there being a tendency to depend on "previous experience." The requirements of the local authorities, although arbitrary and exacting, can scarcely be said to be based on true mechanical principles, and are not always calculated to give uniformity of strength and stability throughout the structure. Believing, therefore, the subject to be well worthy of closer attention than it usually receives, Professor Charnock was actuated to write a very able paper, of which the reprint is before us. In dealing with the subject the author gives a thorough exposition of the interesting scientific principles involved, and deals in detail with (1) the selection of proper materials to ensure durability, (2) the provision of a thoroughly solid foundation, and (3) the proper design to resist overturning. The chapters on wind pressure and its effects on towers or chimneys are highly interesting and instructive. The concluding section of the paper is devoted to the use of concrete steel for tall chimney construction, the example taken being a fine chimney 230 feet high, built for the Portland General Electric Company, at Portland, Oregon, U.S.A., in 1905, in the record time of 58 working days. The paper is fully illustrated with diagrams, and will well repay careful study. It is published at sixpence, and the printers are Messrs. Bradbury, Agnew and Co., Ltd., London and Tonbridge.

"Pocket Companion, containing Useful Information and Tables pertaining to the Use of Steel." This handy little volume is published by Messrs. Dorman, Long and Co., Ltd., the extensive steel and iron manufacturers of Middlesbrough. The tables have been compiled and edited by the constructional department of the firm, and are intended for the use of engineers, architects, and builders. The tables, which are very copious, have been prepared in accordance with the best modern practice to meet the requirements of engineers, architects and others connected with constructional engineering, shipbuilding and allied trades. In addition to the tabular information having special reference to steel and iron, there is a deal of general information contained in the book which make it a most valuable publication. It can be had on application to the company.

"The Production and Use of Acetylene Gas." This handbook embodies a series of articles by Mr. W. Dorman, which originally appeared in the "Engineering Times," and in its present form constitutes a really practical and copiously illustrated work on Acetylene Engineering. The author approaches the subject from the practical rather than the theoretical standpoint, his object being to place the reader in a position to make choice of the most satisfactory method of producing and using acetylene, and to enable him to design and erect the necessary plant for the purpose. At the same time the chemistry of the subject is touched upon in an interesting fashion, and there is a good deal of information given relative to the manufacture of Calcium Carbide and of the history of that compound, as well as of Acetylene Gas. The book will be found of great technical value, and will be perused with interest even by non-technical readers. The publishers are Messrs. P. S. King and Son, 2 and 4 Great Smith Street, Westminster, London.



## OUR NORTHERN LETTER.

(FROM OUR CORRESPONDENT).

## Belfast City Hall.

In my account of the opening of the Belfast City Hall (IRISH BUILDER, Aug. 11), I unintentionally, through desire to condense as much as possible, did an injustice to Messrs. Purdy and Millard, of Belfast. I stated that "the wood-carving contract was divided between Messrs. Purdy and Millard, Mr. J. E. Winter, Belfast, and Messrs. H. H. Martyn and Co., Ltd., Cheltenham." The entire of the wood-carving was executed, both as to modelling and carving, by Messrs. Purdy and Millard in their Belfast works. The carving to stone work was divided among the three firms stated, but even of this Messrs. Purdy and Millard had the largest share (about £3,000 worth). Earlier in the account I quoted from the architect's speech in reply to his health, and may here repeat what he said, namely: "As they (his auditors) went through the rooms, particularly the Council chamber, they would be struck by the excellence of the wood carving, which possessed the same two qualities—it was excellent and it was local." The two illustrations, which appeared in last issue of the IRISH BUILDER, of panels in the Lord Mayor's screen, speak for themselves, and like the rest of Messrs. Purdy and Millard's work, fully deserve the architect's commendation. I meant also to refer to the very beautiful electroliers and fittings throughout the building. They far surpass anything of their kind in Ireland, the large electrolier deponent from the main dome being, in particular, magnificent. They are from the manufacture of Messrs. J. W. Singer and Sons, Frome. Two small literal errors in my account also require correction. The name of Mr. F. E. Porter, Belfast, agent for Messrs. Dörspecker, Ltd., Limmer Asphalte Paving Company, Ltd., etc., should read Mr. F. A. Porter; and the name of Mr. W. T. Shaw, Belfast, agent for Messrs. George Jennings, Ltd., should read Mr. W. J. Shaw.

## Ulster Society of Architects.

The leading article in last issue of the IRISH BUILDER, entitled, "Architectural Home Rule for Ulster," was sent me seeking information as to the attitude of the Ulster Society of Architects. *Prima facie*, it might be assumed that their unanimous action in severing affiliation with the Royal Institute of Architects of Ireland was not without reasonable cause. But, what follows is not an official communication from them. It has been elicited from interviewing a number of their leading members, who were in such substantial agreement that I cannot do better than repeat, so far as memory serves, the words of one of them. With this preface, that I am not a member of the Ulster Society, and hold no brief for it. In reply to my enquiring the cause of severance, "Well," he said, "it's a long story, and largely cumulative, but perhaps the head of offence is that we found the Royal Institute utterly lacking in business capacity. When the Ulster Society was founded, there was an explicit, if unprinted, understanding that affiliation with the Irish Institute was preliminary, and to lead up, to affiliation with the Royal Institute of British Architects. Now, however, when we are ready for this, we find the Irish Institute forcefully opposing us. Had the Irish Institute, in the interim, treated us as it should have done, we would almost certainly have waited till its opposition had died a natural death. But all along it has, in noxious ways, slighted and contraried us. There was its violence, for instance, over our authorising a charge of four per cent., as professional fees, in factory and allied work. You know," he said, "that four per cent. in that way is often much more lucrative than five per cent. in villa or church work, and that in many cases less than four per cent. was previously charged. This fee was, therefore, a levelling up, not a levelling down, process; and many leading members of the Council of the British Institute have since approved our action in the matter. Moreover, we hold that the Irish Institute had no right to criticise us in regard to it. We did not ask its authority, and merely

communicated our action as a matter of courtesy. Within a fortnight of passing a resolution condemning us, would you believe it," he said, "the President and another official of the Irish Institute appeared in the Dublin Law Courts, in the Omagh Asylum case, to prove that the four per cent. remuneration claimed by the architect was the usual and reasonable one? Then, there was the matter of preparing new conditions of contract. A committee of the Irish Institute, after drowsing over it for years, woke up and presented a draft report. Our representatives pointed out that we had not been in any way consulted as to this, and, in referring it back to the Professional Practice Committee for further consideration, a resolution was passed by the Council ordering consultation with us in further action. The next step of the Committee, still without consulting us, and ignoring the resolution of reference, was to present a report in favour of adopting the general conditions of contract authorised by the British Institute. It was one of our representatives on the Council, our President, Mr. Gilliland, who, thereupon, pointed out that, by a very recent decision in the English Law Courts, the general conditions of the British Institute were invalid, in respect that their general arbitration clause applied to the whole contract, even the matters specially and expressly reserved for the decision of the architect alone. So the Committee of the Irish Institute had again to put on their thinking caps, with the result that, a third time without consulting us, they brought in a set of general conditions of their own manufacture, which," he added with a smile, "I'll never live long enough to understand. So, ignored by the Institute, we have been compelled to draft general conditions of our own. Then," he continued, "the Council of the Irish Institute gave us another slap. Desirous of making some acknowledgment to one of our Presidents, Mr. Gilliland, for the yeoman service rendered to us by him, and knowing that anything in the nature of a presentation or address would be repugnant, the leading members of our Council approached the Irish Institute with a view to having Mr. Gilliland nominated for Fellowship of the British Institute. To our applications, however, we obtained no reply, so we went direct to the British Institute and obtained the Fellowship. No sooner was the result announced than the Irish Institute wired and wrote to the British Institute expostulating, much to the entertainment of the British Institute, I may tell you. As to registration, our representative has attended every meeting of the Central Committee in London, whereas the representative of the Irish Institute, Mr. Ashlin, attended only the first. So that will show which of us have taken the greater practical interest in this question. Another matter. The Irish Institute wish our students to go forward for examinations to be instituted by them—which examinations, of course, the British Institute would not recognise. We wish our students to devote themselves to obtaining a qualification which will be valid anywhere in the British Empire, and which will be of substantial service to them, which no examinations of the Irish Institute could be for a generation, at the least. For this object, it is practically a necessity that we should be in direct affiliation and communication with the British Institute. The greater part of the correspondence that we have sent through Dublin, when not merely greatly delayed, has been absorbed by the filtration process. It is mainly this handicap that has moved us to sever our connection with the Irish Institute, and what has precipitated the action of severance has been the conduct of the Irish Institute in connection with its recently instituted Fellowships. A number of us were approached to allow our names to go forward for these, but almost all of us retired in favour of our present President, Mr. J. J. McDonnell, J.P., whom we thought, from his position as our President, most entitled to any honour of the kind going. The Irish Institute, however, thought fit to reject him. This, and these, are merely some of the ways in which we have been slighted and our actions sought to be countered. There are many others. So we have come to the conclusion that we would not be justified in longer standing in the way of an affiliation with the British Institute, which might have been obtained agreeably with the consent of the Irish,



THE BELFAST CITY HALL. VIEW FROM THE COURTYARD.

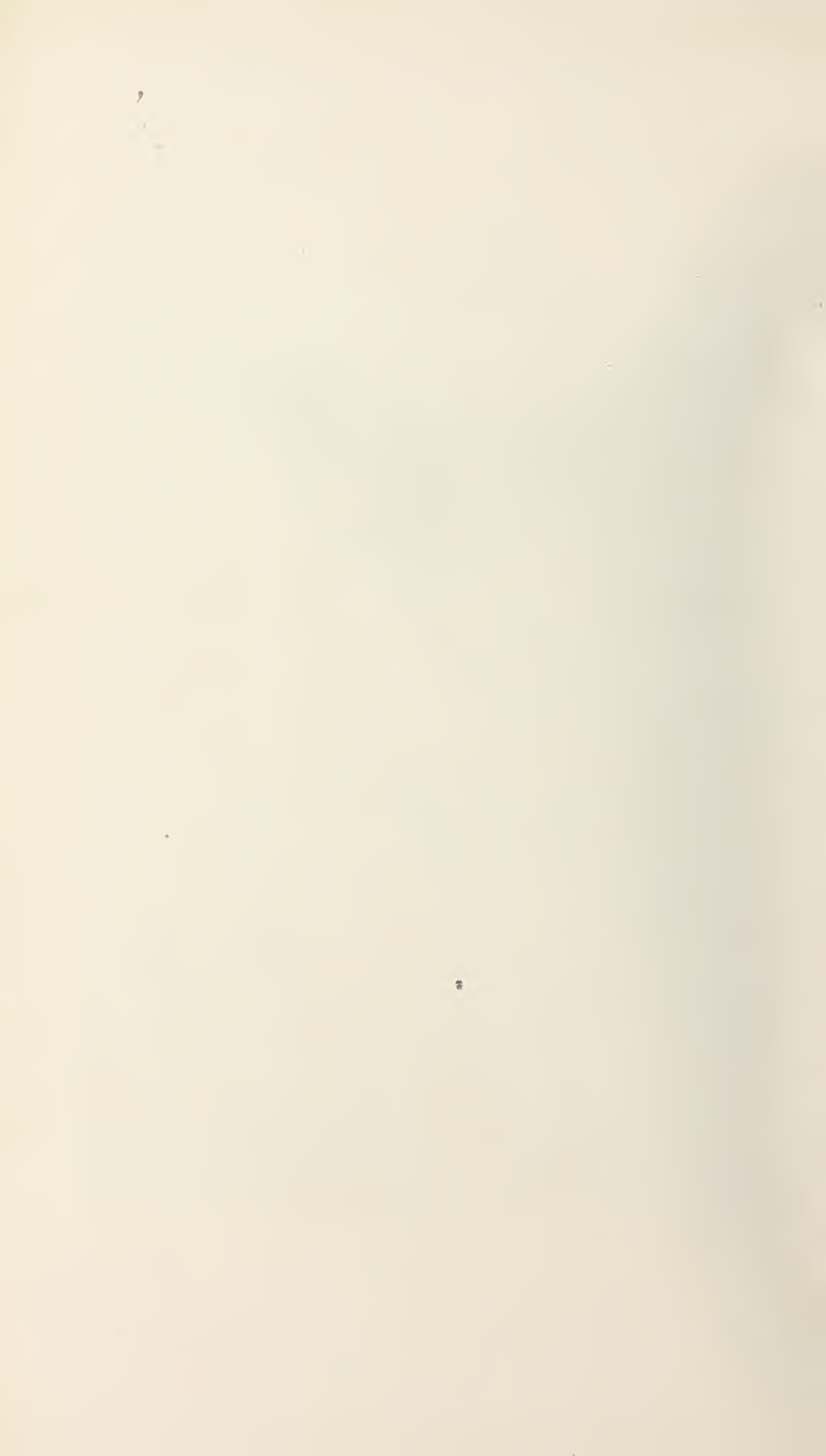






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BELFAST CITY HALL. HEAD OF STAIRCASE.







BELFAST CITY HALL. THE ASSEMBLY HALL.



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and which can be obtained in spite of it. But none of our members, who are also members of the Irish Institute, I am sure, have any intention of resigning membership of the parent body. We feel compelled to act as we have done. But we have no resentment."

A meeting of the Ulster Society of Architects was held in the rooms of the Society on the 24th August to confirm the resolution passed at the meeting held on the 9th July, severing the connection of the Society with the R.I.A.I. This, on the motion of Mr. W. J. Gilliland, seconded by Mr. R. M. Young, was done unanimously, and the necessary amendments to the rules of the Society were then made. This makes the breach final. Only on one matter dealt with in the leading article of last issue do I feel at liberty to make any comment. A letter contributed by me to the preceding issue is referred to as an instance of covert hostility on the part of the Ulster Society. But the Ulster Society did not suggest, and had nothing to do with, my letter, which, however, claimed credit to the Society for securing insertion in the Labourers Bill of a clause requiring professional competence on the part of persons employed as architects under it. In the issue in which my letter appeared, the last of the "Topical Touches" states that "the Irish members" (of Parliament) "who were lately interviewed by our representative in London, did not appear to be aware of them" (the Ulster Society of Architects) "and laid stress chiefly on the circular letter of the Institute." Precisely. But that this had nothing to do with the matter is proven by the fact that, when the Chief Secretary introduced the clause in question, Mr. Redmond stated it came as a complete surprise to him, and that, while he did not like it, he would not hamper the Bill by opposing it. The Chief Secretary is, at the moment of present writing, the guest of Messrs. Robert and R. M. Young, of Cousin and MacKenzie, the one an uncle and the other a cousin, and it was solely by the personal influence of the latter that introduction of the clause was secured.

#### New Gas Lighting.

A new system of gas lighting, which is somewhat of a novelty so far as Ireland is concerned, has been introduced into the buildings of the City of Belfast Y.M.C.A. It is known as the "Selas" light, and is of German patentage. The principle consists in thoroughly mixing air with ordinary gas, in the proportion of one part of gas to two parts of air, and in conducting this mixture through the service pipes to the point of consumption, where it is burned as an incandescent light. In fact it is the principle of the Bunsen burner used to secure greater incandescence by greater heat. The apparatus used for introducing and controlling the supply of air can be readily attached to any existing service of piping. It appears to be simple of construction, to work silently, and to need little power for driving. It is claimed for this illuminant that the consumption of gas, for the same candle-power per hour, is 50 per cent. less than for the best ordinary incandescent light. It is claimed, also, that this new method is independent of local gas pressure; that it requires no chimneys or bulbs, except for decorative purposes; and that existing lamps can be readily fitted with "Selas" burners. The mixture of gas and air can be utilized as well for heating purposes. The present cost of lighting the Y.M.C.A. buildings by electricity is about £270 per annum, and it is predicted that the annual gas bill under the new arrangement will not exceed £75. The installation has been carried out by Messrs. John Dowling and Sons, of Upper Queen Street, Belfast, who are the local agents for the "Selas" light.

#### Londonderry Electrical Undertaking.

Messrs. J. C. White and Co., Cannon Street, London, contractors for the electrification of the Belfast City Trams, have made a novel proposal to the Londonderry Corporation for the purchase of the latter's electric lighting plant: the basis of purchase being the recouping to the Corporation of its capital expenditure, and arrangement of terms for the public and private supply of light. Messrs. White also ask if, in case a bargain is come to, the Corporation would consent to and support an application for an Order of the Privy Council empowering them to lay down, maintain, and work a system of electric tramways. The offer for purchase is somewhat unusual, and rather reverses the usual order of change from private to public ownership of such an undertaking. The Corporation has referred the offer to its Law Committee for an interview with Messrs. White and report. As the electric lighting is a burden on the rates, there seems to be a tendency to accept the offer of purchase.

#### ULSTER SOCIETY OF ARCHITECTS.

A special general meeting of the members of this society was held in the society's rooms, 13, Lombard Street, on the 24th ult., at 8 p.m. The president (Mr. J. J. Mc'Donnell, J.P.) occupied the chair, and among those present were—Messrs. F. H. Tulloch (vice-president), W. J. Gilliland, R. M. Young, J.P.; W. J. Fennell, W. J. W. Rooome, N. Fitzsimons, W. C. Maxwell, W. B. Fennell, and T. W. Henry. Letters of apology were read from Sir Thomas Drew (past president), Messrs. J. P. McGrath (Derry), H. Seaver, H. Lamont, and S. M'Avoy. The President, in opening the proceedings, said that the meeting had been called for the purpose of considering the society's relations with the Royal Institute of the Architects of Ireland, and of finally determining whether their affiliation with it should any longer continue. The members were familiar with the reasons which had led to the contretemps, and it would be unnecessary for him to repeat them. At the general meeting in July last a resolution was unanimously agreed to terminating the affiliation, but it was considered by some that the business noted on the summons for that meeting was not sufficiently explicit, and therefore to avoid misconception the council had called the meeting that night. Having read the circular convening it he invited discussion. This was taken part in by most of those present, after which a resolution reaffirming that of 9th July was moved by Mr. W. J. Gilliland, F.R.I.B.A., seconded by Mr. R. M. Young, and on being put to the meeting was unanimously passed. The alterations to the bye-laws necessitated by the severance of the society from the R.I.A.I. were then considered and agreed to, and instructions given to the council to apply for direct affiliation with the Royal Institute of British Architects. A most interesting resumé of the business portion of the seventh International Congress of Architects held in London in July last was given by Mr. Gilliland at the request of the president. Other representatives present at the congress also spoke, and after some matters affecting professional practice to city architects had been discussed the meeting adjourned.

#### IMPORTS.

##### PORT OF DUBLIN.

August 21, per City of Belfast, 100 tons asphalte, John Reinhardt and Son, Ltd.

August 23, per Ville d'Eu, from Treport, 100 bags plaster, to order; per Lady Roberts, from London, 1,795 bags cement, T. Dockrell, Son and Co., Ltd.

August 25, per Indine, from Bordeaux, 120 tons slates, T. Archer; per Glen Head, from Riga, 35,425 pieces firewood sawn, to order.

August 27, per City of Cadiz, from Hamburg, 100 tons asphalte, J. Reinhardt and Son, Ltd.; 1 case of slates, to order; per Elidir, from London, 100 tons Jarrah wood, Dublin Port and Docks Board; 320 tons cement, J. C. Johnson and Co.; per Irishman, from Creetown, 220 tons granite, W. M'Dermott.

August 29, per Bangor, from London, 340 tons cement, T. and C. Martin, Ltd.; per Lady Wolseley, from London, 1,000 sacks cement, J. Kelly and Sons; 20 firkins lead, T. Dockrell, Son and Co., Ltd.

August 30, per Elsinore, from Fredrikstad and Christiania, 83,288 pieces planed boards, 17,198 pieces scantlings, 900 poles, 139 bales laths, to order; per Winga, from Goteborg, 9 cases glass, 3,200 bundles laths, 814 bundles, 13,791 pieces planed boards, to order.

August 31, per Fredrike Mullar, from Archangel, 475 pieces deals, J. Kelly and Son; 49,067 pieces deals, G. Perry and Co.

September 1, per Alf Pritchard, from London, 150 tons cement, T. and C. Martin, Ltd.

September 1, per Lady Hudson-Kinahan, from London, 700 sacks cement, T. Archer; 60 packages lead, T. Dockrell, Son and Co., Ltd.

September 3, per City of Cologne, 102 barrels asphalte; per Val de Travers, from Treport, 202 bags plaster, to order; per Lenctra, from St. John's, N.B., 98,280 pieces deals and ends, R. Martin and Co.; per William George, from Rochester 220 bags cement, A. Agnew.

September 4, per Dag, from Troudeing, 56,987 pieces boards, W. and L. Crowe, Ltd.; 30,660 pieces scantlings, J. Kelly and Son; per Lever Brothers, from Portmadoc, 102 tons slates, T. Archer; per Velineli, from Port Dinorwic, 100 tons slates, J. Kelly and Son; per Lady Martin, from London, 2,785 bags cement, T. Dockrell, Son and Co., Ltd.



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## THE CONSERVATION OF ANCIENT MONUMENTS.

It is generally recognised in all civilised countries that upon the Governments rests primarily the duty of conserving and protecting ancient monuments from decay or wanton destruction. At the recent Congress of Architects this question formed the subject of several interesting papers, and it may not be uninteresting to abstract from them some particulars as to how such matters are dealt with in other countries, and the views of members of the Congress interested in the subject thereon.

The practice in Ireland was not referred to, but probably all our readers are aware that the Irish Board of Works are the custodians of all ancient monuments that are vested in them, and under this category are included the majority of the more important remains throughout the country; but many mediæval relics of much importance remain at the mercy of private charity, for such it is. Many of the old churches are still used in whole or in part for the purposes of Divine worship, having been vested in the late Established Church, and these are now under the control of the Church Representative Body. They have, for the most part, been more or less happily "restored." Some such as Christ Church Cathedral (the Church of the Holy Trinity) and Kildare Cathedral, while extensively restored, as indeed was essential, have been practically rebuilt in parts, and, on the whole, with satisfactory results. Others, like St. Patrick's Cathedral, have been less fortunate, and have not been very sympathetically dealt with, though the mischief done was not, on the

whole, very serious; although portions of that Cathedral, including the greater part of the exterior, have been restored in a fashion fit to make an architect's blood boil, while others again, like St. Canice's Cathedral, Kilkenny, have been quite spoilt by inconsiderate and unsympathetic "restoration," or, more correctly, by the introduction and addition of details out of harmony with the surroundings, and quite needlessly so. The older remains, such as the round towers and the Celtic crosses, are mostly in charge of the Board of Works, who act through an "Inspector of Ancient Monuments," an office held for many years by the late Sir Thomas Deane, R.H.A., who had under him several assistants or clerks of works. This office is now held by Mr. Robert Cochran, LL.D., F.R.I.B.A., Surveyor to the Office of Public Works. The operations of this department under Sir Thomas Deane and his successor have been very conservative, and have been rightly limited to preservation simply; no fanciful "restorations" have been attempted, and for this we have cause to be grateful. Our mediæval remains, while in many respects extremely interesting, and full of possibilities of study for the antiquary and the architect, are not numerous compared with England, and it seems a pity they should not all, when not vested in one or other of the Churches, come under State control for purposes of preservation. For instance, we believe, if our memory serves us aright, that most interesting and important church, Holy Cross Abbey, Thurles, is not under the control of the State, and is in private hands. It is well cared for, but in the public interest it is important all such structures should be placed beyond the possibility of neglect and further decay.

In a paper read before the Congress, Professor Baldwin Brown, M.A., mentioned that, a comparison of British arrangements for the safeguarding of ancient monuments with those that exist in Continental countries gives the following results. Almost everywhere abroad the initiative has in this department been taken by Governments, while in Britain private individuals and societies have practically done all the work. The British Ancient Monuments Protection Act of 1882, though actually passed as a Government measure, had been due to private initiative. More recently, however, there have been encouraging signs that British Governments are coming to recognise this protection as a suitable matter for State care, and the Ancient Monuments Protection Amendment Act of 1900 represents a distinct advance.

On the other hand, he noted that foreign countries had a larger conception of the State's responsibilities, though it is only in comparatively a few that a Monuments Act, or law, conferring compulsory powers over monuments in private ownership, and the right to expropriate on the grounds of public utility, is in operation. Continental Governments have expressed their solicitude on this matter in various fashions, the most common and one of the most effective of which has been the establishment of State Commissions charged with the upkeep of national treasures of architecture and art. Some of these Commissions have been at work for the best part of a century, while others, as in Holland, have only recently been appointed. They exist in at least a score of European countries. Apart from the maintenance of State Commissions, Continental Governments have shown their care for monuments by issuing numerous rescripts, royal and ministerial, some of which date back to the seventeenth century. The Prussian and other German Governments have been especially active in this depart-

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ment, and about fifty Prussian rescripts of the kind were promulgated between 1815 and 1881.

M. A. Besnard, Architect (Paris), who also read a paper on the same subject, advocated a uniform international programme.

The necessity for such legislation as is here outlined is demonstrated by Mr. W. J. Fennell's admirable paper on Donegal Abbey, published in our present issue. In addition, there are many structures, not of first-class architectural or archaeological interest, which are absolutely neglected, and are the care of nobody. The circumstances of erection, their architects, and other matters pertaining to them, are lost in the course of a few generations. So far back as the early part of 1878 we drew attention to the need for some measures which would deal with, for instance, the minor Dublin buildings of the eighteenth century. The history of the Rotunda Hospital and the identity of its architect are not so well known as might be. It is generally attributed to Ensor, whose representatives still own house property in the City of Dublin. But such matters as these should be the subject of public record.

## COMMENTS.

### A District Council and their Engineer.

The Edenderry District Council lately held a special meeting to consider a report from Mr. Frederick Batchelor, F.R.I.B.A., of Dublin, who at the instance of the Council, had inspected certain houses which have recently been built by the Council under the supervision of their own engineer, Mr. Waters, Mr. Worthington being the contractor. The report was as follows:—

The Clerk read the following report from Mr. Batchelor, who had inspected the houses:—In accordance with the instructions of the Edenderry No. 1 District Council I have inspected the block of 10 labourers' cottages on the Tunnel Road, and the block of 12 cottages on the New Row, Edenderry, which are now being completed by Mr. Worthington, contractor, from the designs and under the supervision of Mr. Waters, the engineer to your council. The cottages on the Tunnel Road at the time of my visit were cleared out and apparently ready for occupation. The other cottages are not so far advanced. It would have been more satisfactory if the inspection could have been made before so much of the work had been covered up; as it is, the following report necessarily excludes the walls, foundations, floor joists, lintels, and arches, and such other work as could only have been examined by extensive stripping. I carefully compared the buildings with the copies of the drawings and specification supplied to me by the clerk of the council, and noted the following deviations and omissions:—Flues—The flues have been built square instead of round, and are roughly plastered. Arch bars—One 3 inch by ½ inch bar only is provided in the living room fireplace. Two are specified. Crane—Wrought iron hangers for the crane have yet to be supplied. Brick work—The partitions between the living room and bedrooms have been built with brick on edge instead of brick on flat. From the explanation which Mr. Waters gave me of the construction of the door frames in these partitions, and of the diagonal braces over same, it would appear as if the lintels over the door openings specified in the plans have been omitted. The object of the braces is not very apparent. They are of too light scantling to serve any useful purpose. They are not specified, and it would be better if they were omitted. Concrete floors—These floors are of excellent material, but judging by the one I tested with water, do not appear to have been laid with proper falls towards the external doors. The patches of cement mortar still adhering to the floors should be removed. Floor levels—The floors of some of the cottages are not nine inches over the ground level. It will be necessary to excavate a portion of the ground at the back of the New Row cottages to comply with the

specification. Cut stone—I did not make a note at the time, but I am under the impression that all the sills of the external doors have been executed in concrete instead of in chiselled limestone. Ventilators—The vents in the bedroom ceiling have been omitted throughout, and also some of the ventilators over the bedroom doors. Windows—Some of the woodwork in the frames and sashes of windows is very rough and faulty. Roofs—The roofs are covered with Killaloe slates of good thickness; the lap varies from 3 inches to 4½ inches, but for the greater part the lap is 3 inches. Some of the slating on the back portion of the roof of the New Row cottages shows slight sagging, due probably to inaccuracy in fixing the rafters. Some of the slates are broken, and some caves slates are missing. The rendering beneath the slates is defective in places, and in some parts is not much more than a skimming. The mortar rendering is of excellent quality. Lead aprons have been omitted over the flashings around the chimneys. If these were provided according to specification the mortar fillet would be unnecessary. The ends or verges of the slating over the gables have not been pointed in cement. Cover flashings or aprons of lead should be provided at each step in the roofs of the New Row cottages. Plastering—A considerable portion of the plastering both on walls and ceilings is very defective, more particularly in the New Row cottages. The lime does not appear to have been sufficiently slaked, and the unslaked particles which are now bursting are very numerous. The plastered reveals to windows project in some cases considerably beyond the face of the dashing. This is not advisable. Eave shoots—These are not properly levelled to fall towards the down pipes, and are consequently holding the water. The down pipes in front are not carried low enough to deliver over the gratings of the gulleys. In heavy rains the water would probably discharge beyond the gully. The insides of the eaves gutters have not been painted two coats. The walls of the privies of the New Row cottages have been built very much out of plumb, and the iron roofs are in winding. The corrugated iron does not in every case project sufficiently beyond the face of the wall to throw off the rain water. Window shutters—The shutters have not as yet been supplied to any of the cottages. Concrete walls—The coping to these walls is defective. The top of the walls should be well hacked and plastered in cement a full inch thick. Generally speaking, the drawings have been closely followed. The Tunnel Road cottages are a few inches wider than the dimensions figured on the plans, and are somewhat better finished than the other block. I return herewith the drawings and specification, and if there is any further information desired by the council I shall endeavour to supply it.

Mr. Waters was then submitted to a severe questioning on the above by the chairman and Mr. Nesbitt. This examination dealt with all the details in connection with the erection of the houses.

The report, as might be expected, reads like a very impartial one, and the defects discovered in the work do not appear to be of an irremediable character, though quite sufficient to cause dissatisfaction and annoyance. It is, of course, difficult to express an opinion on the merits of this "storm in a teacup," as, judging from the discussion which followed the reading of the report, some of the Councillors appear to be much embittered against the engineer, and possibly unduly severe upon him. Cottages built by District Councils seem fated to be the subject of much criticism, the contractors being frequently found most unsatisfactory. The only lesson the incident affords is the necessity for close supervision, and, to ensure this, sufficient remuneration to secure adequate attention by an experienced and qualified architect should be allowed by the Council.

### Dublin Waterworks Extension.

The "Evening Mail" of Saturday publishes the text of Mr. F. Bergin's report to the Waterworks Committee of the Dublin Corporation, who ask the Council to apply to the Local Government Board for their sanction to a loan of £134,842 8s. 6d. for the purpose of constructing a new reservoir at Roundwood. It will be remembered that Mr. Bergin was some little time

ago appointed by the Corporation to act as their consulting engineer in connection with the proposed scheme, which had been devised by Mr. G. J. O'Sullivan, Assistant Borough Surveyor. The necessity for this very considerable outlay is not made quite clear, though possibly upon a fuller examination it may prove essential. When Mr. Bergin was appointed we expressed our pleasure that the Council had not found it necessary to go to London for a consultant, but one of our contemporaries at the time suggested that the appointment of Mr. Bergin was a slight upon Mr. Spencer Harty, the City Engineer, a painstaking and capable official, who, both since his appointment to the important office he holds, and previously as the assistant to the late Mr. Parke Neville, his predecessor, had acquired an exceptionally valuable and intimate experience of waterworks in general, and of the Vartry scheme in particular. We thought at the time that there were no grounds for this view, but now, judging from the fact that Messrs. O'Sullivan's and Bergin's reports were only referred to the City Engineer for comment, there would seem to be some grounds for this apprehension, if we read Mr. Harty's report aright, as he differs from those gentlemen in some details, and winds up by leaving it to the Corporation to be advised by Mr. Bergin. Making all due allowance for differences of opinion on the part of engineers, who, like other men, do occasionally venture to differ, it would seem to us that in so important a matter the citizens of Dublin have a right to expect at least an unanimous report on so important a matter, involving an outlay of such an enormous sum, involving a charge of practically £6,000 a year for sixty years.

Mr. Bergin's report, which comes first in order, gives the results of his examination of the site of the proposed embankment, with details of the plans of the new impounding reservoir. The report states:—The existing reservoir, when full, contains 2,453 million gallons, while the new reservoir will cover an area of 303 statute acres, and contain 1,259 million gallons. By the construction of the latter, the existing storage will be augmented to the extent of 50 per cent., and, after making due allowance for a certain quantity that cannot be efficiently filtered, will be capable of supplying the city and outlying townships served by the Vartry system for a period of eight months, independently of the dry weather flow into the two reservoirs, or for a period of practically nine months with the dry weather flow, which is in excess of the storage usually provided, and should be capable of meeting all possible contingencies. The site selected for the new reservoir is situated immediately above the head of the existing one, and the land required for same has already been acquired and fenced. As this fencing, however, approaches rather close to the high water line at a few points where the ground rises abruptly, and as its base will be from 2 to 2½ feet below the level of the top of the new embankment, it would be desirable to have it pushed back at such points, so that its base would not be lower, especially on the east or exposed side, than 744 feet over ordnance datum, which is the reduced level of the top of the proposed embankment, and in my opinion additional land should be acquired for this purpose. There is also one other point on this side, close to and south of the Ford road, where, owing to the ground rising almost vertically, and being of a loose gravelly nature, the fence, although not below the 744 level, should be pushed back about fifty feet further from the high water line. In every other respect the site, as fenced, is admirably suited for the construction of a storage reservoir. The proposed embankment will be 2,300 feet in length and 50 feet in height, over the surface of the ground at the lowest point of the valley, viz., where it crosses the Vartry river. It will have a top width of 21 feet, and be constructed with an inner slope of 3 to 1 and an outer slope of 2½ to 1, the top being 744 feet over ordnance datum and 6 feet over high water level, the maximum depth of water impounded being 44 feet. The inner slope of the embankment will be protected by pitching, varying from 12 to 18 inches in depth, laid in

shingling in the usual way. Having described the scheme at considerable length, the report goes on:—The estimate for the works appears to have been carefully prepared, and it is based on adequate prices. The bye-pass, the New Reservoir, and the filter beds at Vartry Lodge, suggested by Mr. O'Sullivan in his report of April, the 24th, appears to me to be most desirable; it will undoubtedly be constructed in the near future, and, as the work can be most economically done, while a sufficient number of men and the necessary tackle, etc., are on the ground, I consider that it should be included in the present scheme. Being aware of the anxiety of your Committee to expedite the carrying out of the scheme, I have prepared the above report, and will report at a later date upon the minor points which do not affect the principles of the scheme.

Mr. O'Sullivan's statement, which follows, also reports in minute detail on the entire scheme, which he estimates will cost the sum mentioned above. In his report he sets out the following as the *raison d'être* for the proposed works:—It may be within the memory of your Committee that a very severe drought was experienced in 1893, which tested to the utmost the capacity of your present Waterworks system; and, immediately that the strain in connection with the supply had relaxed, your Committee there and then, acting upon the advice of Mr. Harty, decided that all necessary steps should be taken to obviate a recurrence of such a calamitous state of affairs as that the continuous water supply of the City of Dublin should be jeopardised for one moment. In their view of the seriousness of the case your Committee were strongly supported by the action of the Local Government Board, who, in giving their judgment in connection with the endeavour made in 1894 by the Dalkey and Kingstown Commissioners to free themselves from their statutable obligations, pointed out in a communication to your Committee that: "In forwarding a copy of this letter to the Corporation, the Local Government Board think it right to add that, while they are advised that the drought of the year 1893 must be regarded as an unforeseen accident, they consider that, with the experience of that exceptional season before them, a serious responsibility rests upon the Corporation of Dublin to take such steps as they may deem necessary to protect the inhabitants of Dublin, and the surrounding townships concerned in the Vartry supply, against the consequences of the possible recurrence of an event which could no longer be regarded as unforeseen." Accordingly it was decided that an additional supply of water should be stored during the winter months, and with this end in view the construction of the proposed new reservoir was recommended.

Without the full facts before us it is, of course impossible to determine whether there might not be some less costly means devised for meeting present necessities, and reasonably probable future eventualities. The facts detailed by Mr. O'Sullivan are, of course, common property, and there can be no doubt that a serious responsibility to maintain the water supply of the city rests upon the Corporation. At the time of the great drought of '93 the Old Rathmines Waterworks were made use of to relieve the needs of the city, and we believe an attempt was subsequently made, but failed, to have this supply, which is derived from the Grand Canal, made available as a permanent emergency supply for the city. Whether this possibility still remains impracticable we know not. There is no doubt but that at present in the higher lying districts the pressure is insufficient, and fails to afford a satisfactory constant supply—in fact, it becomes intermittent, even in such low-lying districts as the North Wall in summer.

Mr. Harty's report, which is brief, and, says the "Mail," prepared as the result of reference to him by the Committee of Messrs. Bergin's and O'Sullivan's reports. He differs with Mr. Bergin in some minor details, and, as regards others, suggests fuller information, but leaves it to the Committee to be advised by their consulting engineer.

The citizens in the first instance, and the L.G.B. in the second, will doubtless seek and obtain the fuller





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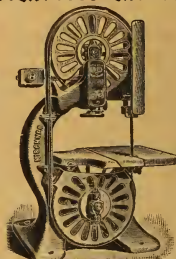
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information suggested by Mr. Harty, before committing themselves to so great an undertaking. As to the financial aspect, the City Treasurer states that :

In calculating the terms upon which it would be feasible to raise the above loan, I have assumed that, the work being of so permanent a character, a period of sixty years would be allowed for repayment. I would hope to obtain the money at  $3\frac{1}{2}$  per cent., repayable by means of a sinking fund. On these assumptions the necessary annual provision for interest and sinking fund on the loan would amount to £5,680 4s. 5d., made up of interest as aforesaid at  $3\frac{1}{2}$  per cent., and a sinking fund of 9s. 3d. per cent., equal to £4 4s. 3d. per cent. This does not include provision for expenses of raising the loan, which might possibly increase the annual charge by about £30.

#### The Secession of the Ulster Society.

Several of our London contemporaries notice the article published in our last issue under the title "Architectural Home Rule for Ulster," some without criticism, but our contemporary, the "Architect," has a little sneer at the proverbial propensity of Irishmen for quarrelling. It might well have been left unsaid; the differences which arose might as easily have occurred in England as in Ireland. The facts would seem to be that Belfast is, perhaps, not unnaturally a bit jealous of the status of Dublin as the metropolitan city, and that the citizens of the Northern town, architects included, are possessed of a somewhat more commercial spirit than is the case in Dublin, which is essentially not a commercial city. Belfast has made wonderful strides during the past few generations, but Dublin, of course, has the prestige of centuries, and is, moreover, the seat of government, the courts of justice, and, above all, the social hub of the country. That there was any stated grievance on the part of the local Ulster Society as against the Institute, we have not heard suggested. Our contemporary says that in seeking direct affiliation with the British Institute the Ulster Society will, doubtless, be welcomed, and we have no doubt such will be the case; but we should anticipate that the British Institute will seek for some more definite explanation of the apparently gratuitous lowering of the recognised professional fee of five per cent. to four, in certain not very clearly defined classes of buildings. If a tendency on the part of employers in Belfast to object to the larger sum prevails, the Belfast architects have themselves more or less to blame, by reason of their want of unanimity in upholding that which, in other parts of the country, is freely conceded by building owners.

The "Architect" also notes the difference which has arisen between the Institute and the Dublin Master Builders' Association in reference to the conditions of contract. Similarly, there is nothing essentially Irish in such a difference: it simply has reference to two opposing views. We ourselves have not hesitated to say that a worse drafted, or more ambiguous form of contract than the old conditions was never drafted, and as that eminent Irish counsel and sound lawyer, Mr. D. B. Sullivan, K.C., once described them, "the fruitful parents of much litigation;" further that the Institute acted unwisely in adhering to their text and verbiage, even adding to, increasing their complexity, and moreover doing so without adequate discussion amongst the general body of the members, or consultation with the builders; but the right of the architects to propose any conditions they please is unquestionable. Of course it is quite another matter for the builders to accept them. It is not quite clear, however, how it is hoped to benefit contractors by enlarging the scope of arbitration, unless on the principle that a "knowing" architect will concede almost anything rather than incur the expense, trouble, loss of time, and odium of a costly arbitration.

We have not seen the Belfast conditions which the Belfast contractors have agreed to under protest, but we hear they are simpler, though, according to the builders' views, less equitable. We venture to say that the right course would have been, both in Dublin and Belfast, to have received the builders' demands, earmarked so much of them as were acceptable, and turned the lot over to a couple of experienced equity lawyers of standing, with instructions to draft the shortest and simplest form of conditions consistent with good law.

As to affiliation with English Societies, we are not at all clear as to the benefits derived; it is always open to individuals to join them if they are qualified, and willing to pay the additional subscription involved, while the kindred institution, that of the Civil Engineers of Ireland, has always got on remarkably well without such affiliation, has its own tests, and adapts itself to suit Irish conditions, preserves its independence of action, and is relatively in a more healthy and vigorous condition.

Our Belfast Correspondent, in this issue, gives the explanation of the somewhat mysterious hint that the action of the Chief Secretary in introducing the Architects' Clause into the Labourers' Acts was wholly due to family influence, attributing the right hon. gentleman's action to the influence of a well-known firm of Belfast architects, Messrs. Young and Mackenzie, the senior partners in which are relatives of Mr. Bryce. We venture to say Mr. Bryce would be believing his reputation as a singularly honest statesman were he to become amenable to such influence. Doubtless, the gentlemen in question put in a word in season, but we happen to know that a somewhat stronger clause, which also suggested security of tenure for architects employed by the District Councils, was in the Bill as originally drafted, that it was struck out on account of opposition—and that it was not until a week or two after the issue of the Institute's circular, and a couple of days after the Society of Architects' dinner, that the clause was reinstated in its watered down form.

#### The Beaux-Arts' Influence in America.

That the Beaux-Arts' influence completely dominates American architectural thought, even amongst those architects who have never been through the Paris school is well known, but that its influence exerted itself so greatly in the details and methods of study amongst those who study at home, we were unaware until we read Mr. Gerard de Witt's article in the "South African Architect" of last month.

Mr. de Witt mentions that:—

The tendency of American Architecture is to follow the French school of Architecture in regard to monumental buildings and city mansions and with that object in view the Society of Beaux-Arts Architects, which includes most of the prominent Architects of New York, is instituted to perpetuate the principles and methods of the Architectural training in use at present at the Ecole de Beaux-Arts in Paris for the doing of the competitions held by the Society of Beaux-Arts among persons especially interested in the advancement of honesty and efficiency in Architectural design.

In order to carry out this object Ateliers or Clubs are formed where the students carry out their studies out of office hours; each Atelier having a patron who is a member of the Society. These Ateliers are not governed by the Beaux-Arts Society, but are got up by men who originally started the idea of working out of office hours in order to become more efficient in design.

The government and management of the Atelier is entrusted to a committee of four of its members, known as the Executive Committee. This committee consists of the Ulassier and three members of the Atelier selected annually by the members of the Society.

The Executive Committee constitutes the trustees of the Atelier and manages the business and financial affairs. The name of anyone applying for membership is submitted for approval at the next election meeting. As soon as five or six candidates have been elected the members of the Atelier fix on a certain night for initiation. Notices are then sent to these newly elected mem-



bers to appear at the Atelier door at the appointed time when they are initiated with that goodwill and humour which is usually associated with students' functions. After a man has been initiated he is called a *nouveau* (freshman) and retains that name until he has done a sufficient number of problems or competitions and has gained a certain amount of distinction among his fellow-students.

All members of the Society have to gain a sufficient number of points in the "Orders of Architecture" before being allowed to compete in Class B (plan competitions), and when proved to be competent in the latter they can compete in Class A, which is the first class.

Every month programmes are handed out, either Order problems, Archiology, Plan, or Esquisse esquisse (sketch sketch). In the case of a two months' problem the men go *en loge* and are only allowed to take such drawing requisites as are necessary for making a sketch, which sketch they have to keep to when working up their problem, and a tracing of which must be handed in before they leave the *en loge*. The programmes of the competitions are only handed in after the students are assembled *en loge*; but in working up an esquisse esquisse (sketch sketch) the student has to hand in his work within a given number of hours, drawn to scale and rendered in colour before leaving the room.

Every two months an exhibition of the Beaux-Arts work is held at the Art Students' League in New York, where the Architects belonging to the Society meet to judge the different competitions.

It may be interesting to the reader to know that a strong feeling of good fellowship exists among the members of an Atelier. It is a very common occurrence when a man, to use a local term, is "up against it" (*i.e.*, can't see his way through to finish the problem in time) to see three or four members give up a whole Sunday or perhaps all night with the object of seeing him through with his work before the drawings are collected.

The patron only visits the Atelier about once a week to criticise the work or to give a lecture. Should a *nouveau* wish to have more criticisms the senior members are always ready to help him out of his difficulties as they have been through the mill themselves. The *Class A* Student does not escape the ordeal of being criticised by the *nouveaux*, on the contrary he is often surrounded by a number of these beings who pass remarks—some passable, but as a rule absurd ones.

All competitions are handed in on a Monday morning at 9 o'clock. Thus when the time comes for the different members to finish their competition it is the duty of the "Corporal-nouveau" to see that the *nouveaux* turn up on the last Sunday at the Atelier to do the dirty work such as making "Chassis," stretching paper on boards, etc.

Attached to the Society de Beaux-Arts is a scholarship called the Paris Prize, which enables a student to spend two and a-half years in Paris and also to gain whatever knowledge he can in travelling through Europe.

In order to win the above scholarship one has to pass three successive competitions, a twelve hour esquisse esquisse and a twenty-four hour esquisse esquisse. From amongst these winners, five, who must be under 27 years of age, are chosen to compete in a two months' competition out of which one man is picked as winner.

Each Atelier has a smoker once a year to which all members of the other Ateliers are invited, as well as the patrons of the several Ateliers and some of the leading Architects who have shown an interest in the "Beaux-Arts Society." Besides these smokers, each Atelier gives a dinner to its Patron, and this function usually takes a distinctly Bohemian and jovial character.

As an example of the class of work expected at these competitions. M. De Witt refers to two competitions, one a Museum, a two months' competition in Class B, and one a nine hour esquisse esquisse in Class A.

The respective programmes set for these competitions were as follows:

#### Class B. PLAN PROBLEM. "A Museum of Sculpture."

This museum is to contain a collection left to it by a wealthy citizen of the town in which it is to be built. The town intends to erect it in a public park, opposite the main entrance of the park.

The museum is to consist of a vestibule, two small rooms, and the museum proper. The small rooms are for the use of the custodian and the curator. They may be either in the front or the rear.

In plan the building is not to exceed 80 by 120 in.

For the Esquisse:

Plan and Section at 1/16 in. scale.

Elevation at 3/8 in. scale.

For the Rendu:

Plan and Section at 3/8 in. scale.

Elevation at 3/4 in. scale.

N.B.—Drawings on tracing paper or in pencil only, will not be admitted by the jury.

The esquisse must be made in ink.

Class A.—ESQUISSE ESQUISSE.

"The decoration of a Pendentine Dome."

A series of pendentine domes forms the vaulting of the reading room of a public library 25 ft. high, their diameter being 25 ft., these domes may be decorated in painting or in relief.

Required: A plan looking up, and a section at 3/4 in. scale.

The average membership of each Atelier is about 60, and at the above-mentioned competitions there were six problems set for which there were 135 exhibitors who sent in 170 drawings.

What an incentive to the study of art it would be if the Architectural Association and the Royal Hibernian Academy had, respectively, a couple of such scholarships tenable abroad! We have often advocated it. To English minds the Ecole des Beaux-Arts system has not resulted in producing the best, the most practical architects, nor has it resulted in a school of truth; but be its demerits what they may, France has at least a School of Architecture in the broader sense, and the students are thoroughly grounded in those foundations of all true study of architecture, the classical styles, or the much-despised "Orders."

M. de Witt mentions that in America architecture is looked upon as a very high profession, and as showing the importance it possesses in that country, he notes:—

At the last bi-monthly competition the following Ateliers took part, viz.:—Cornell University, the Carnegie Technical School of Pittsburgh, the T Square Club of Philadelphia; the Washington University of St. Louis, the George University of Washington, and the Beaux-Arts Studios of Messrs. Hornbostle, Donn Barber and Gellady of New York, on which occasion the President of the Society, Mr. Whitney Warren, stated that for technique and good taste the exhibits averaged higher than any students' exhibition he had ever seen either there or abroad. "Its merits," he said, "will have decided influence in the ultimate formation of a Central Architectural School, which will eventually develop a National American style of Architecture."

## OUR ILLUSTRATIONS.

### The Belfast City Hall.

As promised in a previous issue, we continue our illustrations of the Town Hall. The photographs (for which we are indebted to the courtesy of the Corporation) represent respectively a lesser known, but very interesting, view taken from the Courtyard. The Council Chamber, Assembly Hall, and a view at the head of the grand staircase. The very beautiful fibrous plaster work was modelled and executed by Messrs. George Rome and Sons, of Dublin and Glasgow.

The Thornton Isolation Hospital, near Bradford, is being warmed and ventilated by means of Shorland's patent Manchester Stoves with descending Smoke Flues, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

The Local Government Board lately held an inquiry, through their Inspector, into the case of a sub-sanitary officer of the Dublin Corporation, who had been dismissed by the Public Health Committee for alleged neglect of duty. The Corporation sought confirmation by the L.G.B. of the dismissal, but the Board asked for further particulars, and also invited an explanation from the official in question. The inspector who held the inquiry stated the Committee had no right to dismiss him without first obtaining the assent of the Board. This view, if correct, would seem to show that the local authorities have not arbitrary powers over all their officers.

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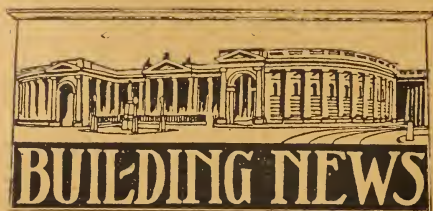
View of Concrete Piles, exposed before fixing Concrete Caps, at the new Works of Messrs. Cammel, Laird & Co., Birkenhead.

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**Athlone.**—The Urban District Councillors invite tenders for the erection of 25 Artizans' Dwellings according to the plans and specification of P. J. Prendergast, Esq., A.M.I.C.E., Northgate-street, Athlone. Tenders must be lodged on the 10th September.

**Blackrock, Co. Dublin.**—The Urban District Council have received tenders for the erection of a platform in the Assembly Room, Town Hall.

**Barr.**—The Parish Priest has been engaged in improving and renovating the old Catholic Church at Barr. The church has been entirely remodelled both inside and outside. Inside a beautiful new altar of Caen stone has been erected by Mr. Sharp, of Dublin, and at the rear are sacristies for the priest and acolytes. At each side of the altar are splendidly finished stained glass windows. One represents the Agony of Our Lord in the Garden. The other window shows a representation of the Redemption. The confessional boxes are artistically finished, and are surmounted by solid carving of a very effective design. The seats throughout the church are substantial, and at the same time of good appearance, while the entire floor has been laid with tiles. The baptismal font is a work of art in itself. It stands some four feet off the ground, and the font is surmounted by a figure representing St. John the Baptist. By a peculiar arrangement the top of the font is so arranged that it can be slid back when the lock is opened. The church is painted throughout in a light green colour, which harmonises admirably with the whole aspect of the building, and gives it a bright appearance. The ceiling is white throughout. At each side of the altar are beautiful life-size statues of the Blessed Virgin Mary and the Sacred Heart. The Holy Communion rails are made of pitch-pine, and are surmounted by a solid mahogany top. Father McGennis has also built a new parochial house convenient to the church. These improvements, together with the cost of the site and other incidental expenses, have entailed an expenditure of about £2,000. The house in every respect is a modern one. It contains the ordinary rooms suitable for a clergyman's home. Adjacent are substantial out-offices. The building was carried out by Mr. Felix O'Hare, Warrenpoint, from the plans of Mr. J. J. McDonnell, M.R.I.A., Architect, Belfast.

**Belfast.**—The new hall and club rooms at Divis-street, for the Irish National Foresters, was recently opened by the General Secretary of the Organisation. The site of the new buildings is at the junction of Divis-street with Hastings-street, with a frontage to the former of 23 ft., and extending back along the latter a distance of 91 ft. The position is an admirable one, being prominent and central, and in the midst, practically, of the district branches for whose use it is principally intended. The buildings have been carried out from the design and under the supervision of Mr. J. J. McDonnell, J.P., Messrs. McKee and McNally (Dungannon) being the contractors.

Tenders are invited for building a factory in Mountpottinger-road for Wm. Hume, Esq., according to the plans to be seen at the office of Messrs. D. M. Cooper and R. Sharpe Hill, architects. Bills of quantities can be obtained from Messrs. McCarthy and Brooks, surveyors, Scottish Provident Buildings. Tenders to be sent on the 8th inst.

The new hospital for infectious diseases at Purdysburn is being constructed by Messrs. Robert Corry, Ltd. We regret that this contract was credited to another firm in our last issue.

**Clohes.**—The Urban District Council received tenders for carrying out the following works:—1. For laying concrete and other footpaths, curbs, channels, and granite crossings, etc., all within the Urban District. 2. For excavating and removing to spoil some 2,500 cubic yards of earthwork at the Council's Waterworks Reservoir, in the Townland of Carnroe.

**Co. Dublin.**—KATHDOWN UNION.—The Board of Guardians of the above Union will, on 12th September, receive tenders for fitting up water closets and urinals at the Workhouse, in accordance with the plans and specification prepared by George T. Moore, Esq., A.M. Inst. C.E.I.

At the last meeting of the Balrothery Rural District Council the further consideration of the new Labourers' Scheme was before the Council, and the members present having discussed with Mr. Scott, architect, the plan of house most suitable, it was finally decided to instruct the solicitor to prepare the proposed scheme, embodying the sites in the Book of Reference submitted to the Council on this day. The scheme is to be laid before the Council for signature at the meeting to be held on the 12th September next. The estimated cost is £35,550.

**Dublin.**—The Improvements Committee of the Corporation of Dublin invite tenders for the erection of Workmen's Dwellings in Townsend-street. Tenders to be lodged on Monday, 10th September.

At the meeting of the Dublin Corporation on Monday, Sir J. Downes proposed the adoption of a report of the Improvements Committee recommending the acceptance of the tender of Mr. John Kelly, Kilkenny, at £46,631 5s. 8d., for the construction of sewers and other works in connection with the main drainage of Clontarf. Alderman Corrigan seconded the motion, and the report was passed. Alderman Coton, Chairman of the Improvements Committee, proposed the adoption of the Committee's report, which asked the Council to apply for a loan of £9,000 to complete the third and last section of the Bride's-alley area housing scheme. Mr. O'Carroll seconded. The report was adopted.

Messrs. Heiton's premises in Westmoreland-street are being rebuilt by Messrs. J. and P. Good, Ltd., contractors.

**Derry.**—A villa residence has just been erected at Foxhall, a few miles outside Letterkenny, for J. S. Walford, Esq., of Grafton-terrace, Templemore Park, Derry. The house is modelled and finished after an American design. The work was entrusted to Messrs. Stewart Bros., contractors, 10 Laburnum-terrace. The architect was Mr. P. H. Elliott, C.E., Property Exchange, Castle-street.

**Eyreecourt (Co. Galway).**—Estimates will be received on 25th inst. for erecting new schools in Eyreecourt and Woodford, Co. Galway, for the Sisters of Mercy. Messrs. William H. Byrne and Son, 20 Suffolk-street, Dublin, are the architects.

**Inishowen.**—The Board of Guardians of this Union received tenders for providing and fixing new casement windows in the Fever Hospital.

**Kilkenny.**—Tenders are invited for a residence at Archers-grove, near Kilkenny, in accordance with plans and specifications by Messrs. W. M. Mitchell and Sons, Architects, 10 St. Stephen's Green, N., Dublin, or at the residence of the superintending architect, A. M. Burden, Esq., M.Inst. C.E., Bellevue, Kilkenny. Bills of quantities for the work have been prepared by Messrs. Beckett and Medcalf, surveyors, 10 Leinster-street, Dublin. Tenders will be received up to 18th inst.

**Newtownwhite (Ballysokerry).**—For the erection of No. 2 National School in Newtownwhite, under Board of Works, the tender of Mr. Isaac Bockett, Ballina (£295), has been accepted.

**Oughterard.**—Tenders are invited for the erection of a teacher's residence in Glann, in the parish of Oughterard, for the Rev. Redmond McDonagh, P.P., Oughterard.

**Rochestown.**—The formal opening of the new Capuchin College, Rochestown, was performed on Sunday last under the happiest auspices. The enterprise, of which the commodious new building is the outcome, affords yet another evidence added to many of the unwearying solicitude with which the good Fathers labour in the cause of religion and learning. Mr. S. P. Hynes designed the college, and the builders were Messrs. E. and P. O'Flynn.

TUCK & CO LTD		
<p>ENGINEERS' PROVIDERS.</p> <p>MILL FURNISHERS.</p> <p>TOOL, MACHINERY AND IMPLEMENT MERCHANTS.</p> <p>Telegrams—TUCKS, DUBLIN.</p> <p>ESTABLISHED 1850.</p>	<p>LOWER ABBEY ST. DUBLIN.</p>	<p>MANUFACTURERS OF AMBROS RUBBER AND LEATHER GOODS.</p> <p>"TUCKSOUL" BELTINGS.</p> <p>"TUCKSOUL" OILS.</p> <p>Catalogues and Samples Free.</p>

# ENGINEERING SECTION.

## ITEMS.

By the time these lines are in print the new route to Ireland, from Fishguard to Rosslare, will be opened for traffic, and we hope will bring its meed of prosperity to the South and West. Three new boats will be exclusively used for passenger and mail purposes, all of which are identical in size, power, and general design, and are appropriately named after the patron saints of the countries affected by the inauguration of this new means of transit, viz., St. George, St. David, and St. Patrick. The St. George is building in the yards of Cammell, Laird and Co., of Birkenhead. The others, which are now completed, were turned out by John Brown and Co., of Clyde Bank. The dimensions are—Length, 350 feet; breadth, 41 feet; and depth, 17 feet 8 inches, the gross tonnage being 2,500. They are propelled by steam turbines of the Parsons marine type, driving three propeller shafts, steam being generated in eight single-ended boilers. The estimated speed is 23 knots, with I.H.P. of about 9,000, and it is fully anticipated that the speed will be easily maintained. In a trial trip the crossing took two hours and fifty minutes, thus practically occupying the same time as the cross-Channel trip occupies between Kingstown and Holyhead. The new route will undoubtedly prove of immense service to the tourist to Cork and Kerry, saving him a long journey *via* Dublin, and it is highly probable that the stress of competition will cause the older services to be more modernised, which, with regard to railway facilities, could readily be accomplished. It will be interesting to note the traffic developments which may be expected to take place in the South-eastern portion of the country arising from the new conditions. The Cork, Bandon and South Coast Railway has decided to contribute largely to the proposed Cork City connections, and there is little doubt that West Cork, especially, will benefit by the rapid transit service which is gradually being evolved.

Whilst thousands of people in San Francisco are still homeless, and are living in discomfort in tents, as a result of the recent earthquake on the North Pacific coast, the shores of the Southern Pacific Ocean have been visited by a convulsion, which, from all accounts, has been equally destructive, although, as far as can be ascertained, the loss of life has fortunately been less. In other respects the results have been practically identical, first the prolonged series of shocks which left few, if any, of the buildings of Valparaiso undamaged; then the subsequent fires to complete the work of destruction, fires which raged unchecked owing to the fracture of the water mains, and, it is reported, to the inability to obtain volunteers for the work of extinction. At Santiago de Chili a severe shock also occurred, and many public and private buildings suffered, but firemen, aided by a heavy rainfall, were promptly able to extinguish the conflagration which has been a feature of these recent American devastations. It is curious to observe what short duration the effects of such awful catastrophes have on the human mind. In San Francisco the new buildings which are already in process of erection are being built as if they were to endure for all time, and beyond the fact that the streets will be widened, open spaces more frequent, and that reinforced concrete is being more generally employed, the lessons of the earthquake have been forgotten. With a deduction based on most uncertain premises, it is thought another severe shock is scarcely likely to occur for at least another fifty years, and, therefore, the next generation, who will be affected, can take care of itself. It is some consolation in the midst of the demands made by public bodies on the architect and engineer, that his buildings must conform to an ever-increasing and confusing number of hygienic, fire-resisting, accident-preventing regulations, that the possibility of volcanic upheavals and seismic shocks have not also to be provided against. But in that providential freedom,

our sympathies are perhaps all the more extended to those who are suffering so severely along the Western seaboard of the American Continent.

From all accounts, which for the present must not perhaps be taken as absolutely authentic, the Nottingham authorities have solved the dust problem. After experimenting for three months, the Corporation of that city has found that calcium chloride, dissolved in the water with which the streets are sprinkled, keeps the roads perpetually damp. We understand that one dressing each month is sufficient to effectually lay all dust, even in the driest weather, the cost per annum of the treatment being about £60 per mile. Hundreds of motor cars are daily driven through the city without the usual concomitant of a cloud of dust. The sorely afflicted in the suburbs of Dublin and other Irish cities will sincerely hope that this new method will not go the way of so many other preventives, which after raising the wildest hopes, have been found wanting in the essential quality for which they are used.

The Report of the Board of Trade on Railway Accidents in the year 1905 has just been issued, and the figures given are a clear indication of the care which the companies bestow on the public. Although the number of passengers killed in train accidents was 39, a larger death-roll than has occurred for sixteen years, 38 of the deaths were due to four exceptionally severe accidents. In spite of these figures, the number of persons injured, viz., 396, was considerably below the average. It will be seen that there was an appreciable decrease in the number of the accidents, but that the severity was increased, owing to the acceleration of speed in recent years. This year will, doubtless, also have its large record of deaths, owing to the serious disaster at Salisbury.

The Report on Errors of Workmanship, No. 25, referred to above, is a record of investigations made at various works throughout the Kingdom, and is confined to measurements obtained on plain cylindrical work selected from locomotives, gun mountings, gas engines, dynamos, high-speed engines, and machine tools. The measurements were carried out by the National Physical Laboratory. All shafts were measured by means of caliper micrometers, compared from time to time with standard length piece most nearly approaching the diameter of the shaft measured. All holes were measured by internal micrometers, provided with rounded ends, the adjustments of these instruments being effected by comparison with a caliper micrometer, checked, in its turn, against one of the standard length pieces taken from the Laboratory. The care exercised is shown clearly in one paragraph of the report, which states that errors in both the measuring instruments and the standard length pieces were compensated for, but accuracy of measurement beyond 0.0005 inch was seldom attained, owing to the presence of foreign matter and the variation of temperature. The report under notice contains no recommendation as to a system of limits, but the measurements which, through the courtesy of the manufacturers, the committee was enabled to carry out proved of material assistance in drawing up their recommendations on the British Standard Systems of Limit Gauges. Over 140 running fits were tested, and the appendices record particulars of 534 tests of plunger fits, close fits, force fits, and errors in workmanship, many of each requiring ten measurements, which vary from two to five places of decimals. The amount of labour involved to obtain reliable data for these two valuable reports can, therefore, in some degree be estimated.

We have recently received two further reports of the Engineering Standards Committee. The report on British Standard Systems for Limit Gauges (running fits) was issued in June, the price being 2s. 6d. net. Amongst the list of members of the committee were representatives of the Admiralty, War Office, the Crown Agents for the



Colonies, the Board of Trade, the National Physical Laboratory, various engineering associations, the British and Brass Tube Associations, and the Automobile and Cycle Engineers' Institute, the last-named body nominating Mr. A. Sharp as its representative. Before laying down any system of limit gauges for cylindrical work, it was deemed advisable to ascertain the accuracy with which work of a varying nature was actually being produced, and a large amount of evidence was adduced by circularising manufacturers and by holding two conferences, at which users and manufacturers were invited to attend. Being anxious to reconcile the conflicting opinions put forward, the committee subsequently carried out, for its own satisfaction, an experimental investigation on the errors in workmanship actually occurring in daily practice, and for this purpose a comprehensive series of measurements was instituted, a complete record of which, together with the report of the National Physical Laboratory to the committee, have been embodied in the Report on Errors in Workmanship issued by the Engineering Standards Committee, No. 25. In drawing up the standard system for gauges, the committee has provided for three classes of workmanship, in addition, for special cases in which a high degree of accuracy is required a further class has been laid down having "Extra Fine Tolerance and Allowances." "Tolerance" is defined as a difference in dimensions prescribed in order to tolerate unavoidable imperfections of workmanship; "allowance" as a difference in dimensions prescribed in order to allow of various qualities of fit. The committee decided to make no recommendations with regard to force, shrink, or push fits, and the report deals entirely with running fits. Appended to the explanatory report are tables of standard tolerances and allowances for the four qualities of work considered, the diameters of shafts and holes from  $\frac{1}{4}$ -inch to 12-inch (nominal) being given to four places of decimals.

### THE DUPLEX RADIATOR

It seems rather incongruous, in face of the superabundant natural heat with which "Old Sol" has been supplying us of late, to descant upon artificial warming apparatus. At the same time there is no getting over the fact that, notwithstanding a temporary heat-wave, the glory of the summer is gone, and before many weeks have elapsed, the chilly outposts of winter will be declaring their presence. Such being the case, the subject of heating is not so premature as it might otherwise seem, more particularly as in this, as in other things, it is well to make our preparations in advance. Nowadays discussions on the subject of heating focus themselves, as a rule, on the relative merits of coal and gas fires. Coal has on its side the advantage of long usage, but that the drawbacks associated with its use are considerable nobody will deny. In the first place the ordinary coal fire is the reverse of economical, because most of the heat is sent up the chimney, and in the second place, the use of coal entails smoke, ashes, dirt, and inconvenience. It is little to be wondered at, therefore, that the old-time coal fire tends to become obsolete, giving place to the cleaner, simpler, and more efficient method of heating by gas. Now as to gas as a heating agent, it may be said at the outset that there are gas stoves and gas stoves. Most of them, as a rule, are constructed on what is known as the "Bunsen" principle, in which a mixture of gas and air is burnt. This combination burns with a blue flame, and produces greater heat than a white (or illuminating) flame, where gas is burnt without air mixture. The difficulty is that this blue flame does not consume all the component parts of the gas, and gives off during combustion carbon monoxide, a most poisonous and ill-smelling compound. Many of these stoves are used in dwellings without flues, in which case they are highly detrimental to health, and if a flue is used they are open to the objection which we have urged against the coal fire, namely, that most of the heat goes up the chimney. There would thus seem to be grave objections against the utilisation of the blue or "Bunsen" gas flame, and it remains to consider the claims of the white flame, such as we are familiar with for lighting purposes. In the first place

the white flame is not open to the charge of imperfect combustion. In it all the component parts of the coal gas are consumed, and consequently there is no necessity to provide flue connections or extensive ventilation, with the result that all the heat-units generated may be preserved. Secondly, there are, as a matter of fact, in the white flame, as many heat-units as in the blue flame, and it only requires different treatment to avail of these heat-units. The merit of the Duplex Radiator consists precisely in this, that it is so scientifically constructed as to utilise all the heat-units of the white flame. In this invention the heat of the burning gas is, first of all, imparted to upright tubes, in which are contained what are called Baffle Plates, being discs of metal placed at short distances apart, and having



stellated edges, between which the hot air passes, and forms a self-contained heating chamber between each of the discs. The heating capacity of an apparatus (such as the Duplex Radiator) is constructed on this principle, is very great, and its hygienic value has been established by the report of the "Lancet" Special Analytical Commission, and by the report of Dr. Bonney, a practitioner of many years standing in Chelsea. This gentleman, speaking on the subject of gas fires in bedrooms, emphatically contradicted "the idea that they are injurious to health, and declared that on the contrary, they are indispensable to all but the most hardy—not one atom less healthy than coal fires, and a hundred times more convenient. Everyone who is in any way delicate, especially on the chest, should have a gas fire in the bedroom. This, we think, is exceedingly high testimony to the value of the Duplex Radiator, which is, therefore, worthy the attention of all interested in the installation of heating apparatus. The invention is an American one, but the address of the English Agency is C. J. Morehouse, 37A Southampton Row, London, W.C.

### REPORTED NEW ELEMENT.

According to a Cologne paper, Professor Battelli, of the University of Pisa, has discovered a new element more powerful even in its action than radium. He observed some time ago in the water of the San Giuliano spring some remarkable shining appearances, and after many experiments he found these waters to be strongly radio-active. He accordingly set to work to collect and condense the gaseous emanations, and installed steam-pumping machinery for this purpose. The gas procured by these means was, after being purified, conducted by small tubes coated with zinc sulphide into liquid air. The condensed gas at once became apparent, and imparted a green colour to the sulphur. No determination respecting the nature of this substance has, however, yet been possible.

# CONTINUOUS FILTERS FOR SEWAGE PURIFICATION.

So much attention has of late years been directed to determining the best methods of purifying sewage, and while no one patent can lay claim to giving uniformly the best results under every set of conditions, however varying, it has become pretty generally recognised that bacteriological treatment, first by anaerobic action in "septic," or decomposing tanks, with subsequent filtration and aerobic bacteriological action, is the solution of the future. Many varieties of treatment have been devised, nearly all at the present time include the septic tank, or "Glorified cess-pool" as it has been called, the main differences being in the subsequent method of filtration. The Local Government Board have generally demanded "double contact," that is, two separate filtrations subsequent to tank treatment, or else filtration and subsequent irrigation over land, which latter, it is now held by many authorities, except in cases where the land is peculiarly suitable, and of course, no heavy loamy or swampy land can be so described, only the lighter and more porous soils, with a gravelly sub-soil, being properly so designated. Filters, broadly speaking, include contact beds alternating, but it is customary now to separate them into "double contact beds" and continuous filters, properly so-called—some working on the alternating principle by means of automatic gear, and others on the continuous principle, with or without mechanical assistance. It will readily be conceded that, while a continuous filter, operating without any adventitious aid from appliances or alternating gear, may be the simplest and possibly most suitable arrangement for small systems, such as domestic installations, some arrangement, either of alternation of continuous sprinkling, will in the larger systems, tend towards efficiency by increasing aeration, and tending to prevent clogging of the beds or filters through becoming sewage sick.

A system which has recently met with considerable success is that of the "Fiddian Distributor," which is applied to a continuous filter, and works as an automatic revolving sprinkler. It is the patent of Messrs Birch, Killon and Co. One of their distributors has lately been fitted up near Dublin, but we have not at present detailed particulars of the results attained. However, the Cannock Rural District Council have lately completed the new sewerage works which have been carried out at Brewood in accordance with a scheme formulated by the Engineer to the Cannock District Council (Mr. Herbert M. Whitehead). The total cost of the undertaking, which has been executed by Mr. W. H. Reading, of Wolverhampton, amounts to £1,550—£100 less than the engineer's estimate. The works are situate to the east of the township, near to the stone bridge, on land which has been leased from Mr. F. Monckton, of Stretton Hall. The effluent is discharged into the Chillington Brook, which is a tributary of the river Penk, and is the stream which has for many years been polluted by the sewage of Brewood. In the design of these outfall works the bacteriological system of sewage disposal has been adopted, and the works consist of a storm overflow chamber detritus chamber, septic tank, and two circular filter beds, and are intended to deal with in maximum 24,000 gallons per day, which amount is equal to three times the estimated daily dry weather flow; and, in addition, a special storm-water filter, which takes its supply from the storm overflow chamber, has been provided, to deal with a further 24,000 gallons of storm sewage. Thus the total quantity of sewage which can be dealt with at the outfall works is 48,000 gallons per day, or an amount equal

to six times the estimated daily dry weather flow. Another overflow has been provided nearer the township, discharging directly into the stream all the sewage above this amount. The sewage, on entering the outfall works, flows through the detritus chamber, in which all solid matters are retained; thence through submerged weirs into the septic tank, which is 7 ft. 6 in. deep, thence over similar weirs with a chamber containing valves, by means of which the tank effluent is admitted to either or both of the distributors. The distributors are the Fiddian revolving patent, and are worked on the water wheel principle, sprinkling the tank effluent over the surface of the filter beds. In the floors of the filter beds are fixed under-drains, which carry the effluent into the main effluent sewer. The underdrains are covered with saggers, broken to various sizes, making each filter the total depth of the filtering medium 5 ft. 6 in. From the disposal works, the main outfall sewer is carried up the fields into Brewood Hall lane and along the pavement, and into this main sewer is discharged by means of smaller contributory sewers the sewage from the whole of the township, the population of which is estimated to be 1,000.

The following testimony is given by probably as high and impartial an authority as ever investigated and reported upon the question, in recent years, of sewage purification. All other systems and methods of distribution in use in England were examined, and those named below were selected for practical trial:—

REPUBLIC OF FRANCE.  
MINISTRY OF EDUCATION.  
NATIONAL BOARD OF SCIENTIFIC RESEARCH.

Extracts from report of October, 1905, on the purification of sewage, carried out at the Pasteur Institute, at Lille, by Dr. Calmette, Professor Buisine, and others:—

The Fiddian distributor can be seen at work in England... and in France at our experimental works at La Madeline, Lille.

The bacteria bed, together with its distributor on rails, is only about 7 ft. 2 in. in height for a thickness depth of media of 5 ft. 9 in. The result of the purification is as

perfect as can be desired; the co-efficient varies from 80 to 92 per cent. with an average flow of 220 gallons per square yard of surface per day. The effluent is always absolutely clear and non-putrefactive, notwithstanding that the apparatus has been at work without ceasing day and night for three months.

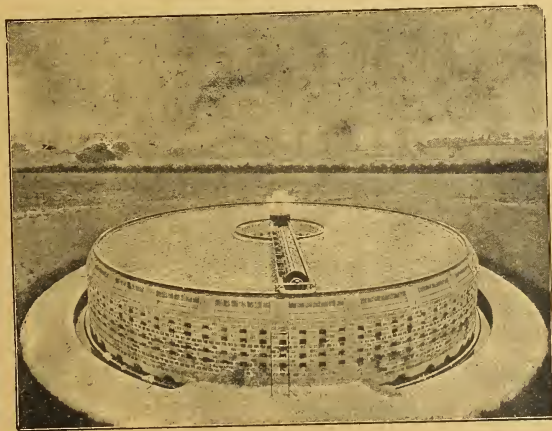
Nitrification has set in very rapidly and actively in the bed fed by the Fiddian Distributor. We have also proved that the number of microbes is much less than in the effluent from the contact beds.

This automatic distributor, substantial, and not affected by wind, appears to us remarkably interesting, and we call particular attention to it.

Figures are given in the report to show the relative quantities purified by means of (1) double contact beds; (2) the Fiddian Continuous filter. These are as follows:—

System of treatment.	Volume treated per sq. metre.	Maximum percentage of purification effected.
Double Contact beds	500 litre	86 per cent.
Fiddian Continuous filter	5 ft. 9 in. deep	1200 " 92 "

Thus it is shown, according to this report, that a Fiddian Continuous Filter is more than four times as efficient as contact beds.



FIDDIAN DISTRIBUTOR.  
Revolving Pattern for Continuous Filters (Birch-Killon Patent).



**DISH-WASHING BY MACHINERY.**

It is due to the enterprise of the proprietors of the Dolphin Hotel that there has recently been introduced into Dublin one of the most modern examples of the application of machinery to domestic purposes. We allude to the "Vortex" Dish-Washing Machine, which has recently been installed by Mr. Nugent in his well-known premises in Essex-st., and of the working of which he recently gave an illustration to some members of the city press. The arrival of this machine in the Irish metropolis has been somewhat delayed, inasmuch as it has been for a long time in use in most of the hotels, colleges, and public institutions in the United States, and it has also been adopted widely in England, on the Continent, and by the principal Trans-Atlantic Steamship Companies. Dish-washing machines are not by any means a new idea, as is evidenced by the fact that the proprietors of the "Vortex" machine have devoted fifteen years of earnest effort to the solution of the special problems involved, and to the overcoming of the many purely chemical and mechanical difficulties which have proved stumbling blocks to hundreds of inventors and scores of manufacturers. The result of this fifteen years' of personal application is exemplified in the working of the "Vortex," which is a thoroughly efficient dish-washing machine. In practice the dishes are placed in wire baskets containing wooden interiors, which prevent them coming in contact with the metal. The basket is first lowered into the washing-tank, and allowed to remain there for about twenty seconds. It is then raised and lowered into the scalding water of the rinsing tank, where a couple of plunges remove the soap-suds, and finally it is left on the draining board to drain and dry, while another basket is lowered into the washing-tank. The dishes dry from their own heat, and present, without the use of towels, a polish which it is almost impossible to obtain by handwork. It is worthy of mention that the dishes washed in these machines are hygienically cleaned and thoroughly deodorised, the first because (it not being necessary for the hands to come in contact with the washing water) strong alkalis can be used to neutralise all animal fats, etc., and the second, because the plunge into the scalding water of the rinsing tank takes away every taint, another result difficult to attain by hand-work. In the construction of the "Vortex" machines special attention has been devoted to economy of working. The power required to drive one is very small, for example, the two-tank "Vortex," running at full capacity, if driven electrically, consumes only about the same amount of current as is required for three incandescent lamps, the expense for water is reduced to a minimum, there being no unnecessary overflow or waste. The hoist for raising and lowering the baskets is also excellently designed, as by a downward pull of 6 lbs. the operator can raise a basket full of dishes weighing 30 lbs. A woman can thus easily operate one of these machines. From practical experience of the "Vortex" machine, Mr. Nugent, of the Dolphin Hotel, to whom, as we have said, is due the credit of being the first to introduce them into Dublin, is convinced of their efficiency and economy, and there is no doubt that they will be found an indispensable adjunct in all up-to-date hotels and establishments where a large amount of catering has to be done. The English address of the company is the Hamilton-Low Company, 16 Henrietta Street, Strand, London, W.C., (W. Nones, Resident Manager).

**ANSWERS TO CORRESPONDENTS.****Rolled Steel.**

**YOUNG ARCHITECT.**—A fair builder's price in Dublin for rolled steel joists, of average weight, fixed in position, would be about 9s. per cwt., inclusive of hoisting, carriage, and profit. Such joists may be bought wholesale for about 6s. per cwt., delivered in Dublin at quay side. When joists have to be raised to considerable height, are of extra great length or weight, or have to be ordered "from stock," the price is increased. Stone templates would be priced extra.

You can get catalogues, with tables of weight, strength, breaking weight, etc., from any of the leading makers, such as Dorman, Long and Co., of Middlesbrough, who are amongst the largest makers of British mild steel

**FERRO-CONCRETE CONSTRUCTIONS (HENNEBIQUE'S PATENT.)**

From the subjoined list of contracts, secured by various licences, under the Hennebique patents, it will be seen that ferro-concrete continues to make rapid headway as a material of construction for buildings and engineering structures. The most important works in the present category are the extensive sheds and granary for the Avonmouth Docks, near Bristol, a class of building for which ferro-concrete is admirably suited owing to its unique fire-resisting qualities. Among the five bridges for which contracts have been signed is one of considerable size for the Earl of Crewe. The North-Eastern and Great Western Railway Companies, who have made extensive use of Hennebique ferro-concrete, are further applying the same material in warehouse and engine-shed construction, and an interesting application is to be found in the large berth for war vessels as the well-known Elswick works. Finally we may point out that the suitability of ferro-concrete for public buildings is evidenced by the adoption of this material during the past month for the new offices of two important county councils.

**CONTRACTS SETTLED IN HENNEBIQUE FERRO-CONCRETE DURING THE MONTH ENDING AUGUST 15TH, 1906.**

Bridges.—Barugh Low Bridge, Barton; Bridge at Crewe, for the Earl of Crewe; Faseley Street Bridge, Birmingham; Footbridge, Church near Accrington, for Messrs. Steiner and Co., Ltd.; Milford Bridge, Derby.

Sewage and other Tanks.—Tank at Guildford, for the Borough Council; Sewage Tank, Malvern, for the Urban District Council. Wharves and Quays.—Wharf at Elswick, for Sir W. G. Armstrong, Whitworth and Co.; Berth for Armour-clad Vessels, Elswick, for Sir W. G. Armstrong, Whitworth and Co.

Public Buildings.—New County Offices, Newcastle, for the Northumberland County Council; New County Offices, Shrewsbury, for the Shropshire County Council; Storches Hall Asylum (Floors), Kirkburton, for the Yorkshire West Riding County Council; Oozells Street Schools (Staircase), Birmingham; Library and Offices, Park Place, Cardiff, for the Engineer's Institute.

Manufactories.—Royal Starch Works, Paisley, for Messrs. Brown and Polson, Ltd.; Floors, Church near Accrington, for Messrs. Steiner and Co., Ltd.; Foundation for Factory, Riley Street, Bermondsey, S.E., for Messrs. Grant and Co.

Railway Buildings.—Porth Bank Warehouse, Newcastle-on-Tyne, for the North Eastern Railway Co.; Engine Shed, Wolverhampton, for the Great Western Railway Co.

Warehouses.—Extension of Premises, Preston, for the Co-operative Society; Warehouse, Beverley Road, Hull, for Messrs. Blunde, Spence and Co.

Dock Buildings.—Sheds and Granary, Avonmouth Docks, Bristol.

Foundations.—Foundation for Refuse Destructor, Benwell, Newcastle; Foundation for Factory, Bermondsey (see Manufactories).

**TIMBER PRESERVING EXPERIMENTS.**

Interesting experiments in the creosoting of timbers as a preservative have recently been made by the Forest Service of the United States. One set were made to determine whether cheap and quickly-grown timbers, like cottonwood, willow, elm, and maple, could be made durable enough for fence posts, the treatments being made in an upright tank with heat applied direct. As yet the work has been too brief to be conclusive, but there is every indication of success.

The second series was on loblolly pine and red oak cross-ties, to determine how these important and most abundant timbers can be most economically treated. Both were found readily capable of treatment, and both when treated were fully satisfactory for ties. In connection with these treatments a series of tests were made on loblolly pine, to determine the effect on the strength of wood both of the preliminary steaming process and of the preservative—zinc chloride and creosote. With each process the strength of this wood was increased.

Another work of this kind done by the Forest Service last year has been to design special open treating tanks for the treatment with creosote of soft poles for telegraph and telephone purposes. This is said to be the first apparatus used in the United States for impregnating these poles, and it acted with every success. The poles so treated have been set in an experimental section of one of the main lines of the country, each standing between a green and a seasoned, but untreated, pole for comparison. Different preservatives were used, and it is hoped that in the course of a few years valuable lessons as to the best means of prolonging the life of these poles will be obtained.

Five other investigations in wood preservation were commenced last year in co-operation with different railway companies.—"Master Builders' Association Journal"

LAW CASES.

**Councillors and Contracts Under the Labourers' Acts.**

The inquiry into charges of overpayments for works under the Labourers' Acts in the Rathkeale Rural District was resumed at Rathkeale before Mr. J. Coffey, J. P., and Mr. A. D. Price, C.E., L.G.B. Inspectors, and adjourned on Saturday, owing to the fact that Mr. Hartigan, the engineer, said members of the Council were peculiarly interested in contracts, though he refused to give the names of the members implicated. The adjournment was in order to enable him to reconsider his position.

Mr. Hartigan was examined at length by his counsel, Mr. Cecil Atkinson, B.L. (instructed by Mr. P. T. Liston). He admitted that he signed certificates for payments for work done which was not actually done at all, and some of which was not yet completed. He did this imprudently under pressure of the Councillors. The payment was passed by the Council before he made his inspection. That was a practice which he considered most improper.

Mr. J. Coffey, J.P.—Why did you do it?—Well, pressure of work, and the bad system of payment. I very often took the Guardians' word for work done, when if I had more time at my disposal to make my inspections, I would not have so acted.

Had you any reason to think that the Councillors so pressing you were in some cases holding a pecuniary interest in the contract themselves?—I believe they had, or else they had a financial interest in the contractor, not in one isolated case alone, but throughout the district.

What were your reasons for believing that?—I did not consider it my duty to act the policeman on my Board, but I heard it stated to me every day that So-and-so's brother, father, or son was a contractor.

Mr. Coffey—It is my duty to ask you for the names of those Councillors who were interested in the contract? You put me in a very awkward position, sir.

Mr. Atkinson said that was a very hard question to ask, having regard to the position his client held under the Council.

Mr. Coffey—I think it is hard, but we have our duty to discharge.

Mr. Atkinson contended that his client should be allowed the same privilege that he would have in a court of law, namely, not to make any statement that would leave himself open to an action for libel.

The Inspectors having consulted in private, Mr. Coffey announced that, having regard to the gravity of the issue, they would adjourn the inquiry in order to give Mr. Hartigan and his counsel an opportunity of looking into the matter.

**Ancient Lights Dispute.**

In the case of Fear v. Morgan before the Court of Appeal, the defendant's appeal from a judgment of Mr. Justice Kekewich in the Chancery Division was dismissed with costs, and the decision of Mr. Justice Kekewich affirmed. The action was brought by Mr. and Mrs. T. F. Fear for an injunction to restrain the defendant, Mrs. Margaret Jane Morgan, from erecting or permitting to remain erected on her land at Aberystwyth, adjacent to the plaintiffs' premises, any structure so as to darken or obstruct any of the ancient lights of the plaintiffs. The plaintiffs also claimed a mandatory injunction and damages. The plaintiffs were lessees for a term of 21 years of No. 16 North-parade, Aberystwyth, consisting of a dwelling-house, wine and spirit vaults, and out-buildings in the rear. In a portion of the plaintiffs' buildings looking towards the east were two windows, faced by land belonging to the defendant, upon which where the same adjoined the plaintiffs' land there formerly stood in front of the windows a wall about 6 ft. 10 in.-high. The plaintiffs alleged that the windows were ancient lights, and that in May, 1903, the defendant began to build upon the wall so as to increase its height. The plaintiffs alleged that this had deprived them of a substantial quantity of light, thus diminishing the value of their premises.

Defendant pleaded that the lease of the premises was originally vested by the Corporation in one Watkins, who surrendered that lease to the Corporation in view of another

lease being granted, which was assigned to the plaintiffs, and that in view of that surrender by Watkins all rights of light, if any, to the plaintiffs' windows over defendant's premises became extinguished. Defendant also said that her lease, one granted originally to Watkins, gave her power to raise her wall as she had done. She further denied that there had been any substantial interference with the plaintiffs' lights.

At the trial the claim for a mandatory injunction was not pressed, and, in the result, Mr. Justice Kekewich held that it was immaterial whether the plaintiffs entered into the property by virtue of the prolongation of the old lease, or whether they came in under a new lease in 1900. Under the new lease Watkins got the benefit of the uninterrupted enjoyment up to that time of any light that had been acquired by right. That being so, it was competent for him to say that he would not insist upon it. But he had to regard all the surrounding circumstances in order to determine whether, when Watkins took the lease, he was entitled to insist upon his rights of light. In his lordship's opinion, Mr. Watkins was entitled to insist upon his right, and in his judgment the access of light to the windows in question must not be obstructed. He accordingly granted the plaintiffs a declaration in that sense, and judgment was entered accordingly.

**The Costliness of Arbitration.**

The costliness of arbitration and the risks incurred by contractors adopting it in preference to the ordinary proceedings in the Courts was exemplified in a bankruptcy case heard at Manchester. The bankrupt was a mining engineer and colliery manager. With his savings he was able to set up as an asphaltier. He took a contract from Messrs. Naylor Bros. to lay asphalt and tar paving on eight bridges of the North-Eastern Railway. The contract amount was £900. When about two-thirds of the work was executed one of the engineers varied the terms of the contract. At that time the bankrupt stated £470 was due to him. He declined to complete the contract unless the original conditions were adhered to, and Messrs. Naylor had to carry out the work. The bankrupt's claim for £470 was referred to arbitration, and after five days' hearing the arbitrator found that nothing was due from Messrs. Naylor. The bankrupt was ordered to pay £150 to them, with costs amounting to £420. His own costs were £340. In other words there was a direct loss on the first contract of £1,350. The judge expressed his sympathy with the bankrupt, and granted his discharge, suspending it for the minimum period.—"The Architect."

**GERMAN CEMENT INDUSTRY.**

The United States Consul-General in Berlin, in reporting on the Portland cement industry in Germany, says that it is the most mysterious and difficult industrial branch for a foreigner to investigate and to gain any definite knowledge concerning. The cement factories are organised into more or less loosely-established combinations or associations, which in some instances have taken the form of syndicates. All the statistics in each group are the carefully guarded property of each branch syndicate, and are not published in any united or consecutive form. Germany has in all 320 cement mills, in 117 of which Portland cement is manufactured. The production of the syndicated Portland cement factories in 1904 was 27,950,000 barrels, but figures for the entire German output are not obtainable. The lowest point in the history of the cement industry of Germany at which the aggregate sales of all the factories bore the lowest proportion to the total capacity of production was in 1902, when the sales were only 50 per cent. of the whole production capacity. The percentage was but little higher at the close of 1905, but during the present year the cement business has somewhat improved, owing in a great measure to the effects of the mild winter upon building operations. Still it is a very much overdone industry, and, although German cement ranks at the very top in respect to quality, home competition and the pressure of outside factories are so great as to keep the price down to a very close margin of profit, and to render the position of the great manufacturers constantly difficult and embarrassing. The Consul is told that cement is sometimes sold in Berlin at a profit of only 50 pfennigs per barrel to the manufacturer. The prices vary greatly, according to the district in which the product is sold.



## ENGINEERING NEWS.

**Callan.**—The Board of Guardians will, on the 15th September receive tenders for the carrying out of the Workhouse drainage scheme, the construction of sewage purification works, etc., according to the specification prepared by A. M. Burden, Esq., C.E., Kilkenny.

**Kilmuckridge.**—The Gorey Rural District Council will today, 8th September, receive tenders for the execution of sewerage works at Kilmuckridge.

**Newbridge.**—Mr. H. D. Price, Engineering Inspector, Local Government Board, held an enquiry respecting the application of the Nass No. 1 Rural District Council for a loan of £7,000 for the purpose of carrying out a sewerage scheme for the town of Newbridge. Mr. F. Bergin, B.E., gave evidence on behalf of the Council. No objections to the scheme were lodged.

**Newcastle (Co. Down).**—The Urban District Council invite applications from engineers for the preparation of plans, etc., and necessary supervision for the carrying out of a scheme of sewerage with purification for the township. Applicants to state terms, qualifications, references and experience of similar works, to be sent before 22nd inst. to Mr. Daniel Curran, Town Clerk.

## FREEZING METHOD OF TUNNELLING.

Experiments are now being made by the Pennsylvania Railroad Company upon a new system of tunnelling for alluvial and water-logged soil, with the view of applying it to future operations beneath the East River, New York. The method may be thus briefly described. A small iron-lined pilot tunnel is first driven along the proposed line, and in it is installed a series of brine-circulation pipes capable of freezing the moist material within a radius sufficient to permit the enlargement of the tunnel to the required dimensions without the necessity for employing compressed air. Of course, air pressure would still be necessary for driving the pilot tunnel, but on a smaller scale, and therefore far less likely to blow holes through the bed of the river beneath which operations are being conducted. The result attained so far by the railway company is that the soil has been frozen for a distance of about 9 feet in every direction outside the pilot tunnel, and it is hoped that it will be possible to obtain a frozen cylinder of 35 feet external diameter, thus permitting the tunnel to be enlarged to the diameter of 25 feet by an ordinary boring shield. If this method should prove to be a practical success it will do away with the delays and risks inseparable from the use of compressed air.—"The Builder."

## QUEEN'S COLLEGE, GALWAY.

SESSION 1906-1907.

## DEPARTMENT OF ENGINEERING.

## ENTRANCE EXAMINATION.

19th OCTOBER, 1906.

The Matriculation Certificates of the Queen's Colleges, Belfast and Cork, and of the Royal University of Ireland, and of other Universities within the United Kingdom, are accepted by this College.

All Lectures, Scholarships, Exhibitions, and Prizes are open to Women.

## JUNIOR SCHOLARSHIPS.

First Year—Two, value £20 each. Second Year—Two, value £20 each. Third Year—One, value £20.

The Examinations for Scholarships of the First Year will commence on the 24th October, of the Second Year on the 19th October, of the Third Year on the 22nd October.

## EXHIBITIONS.

The Council may award Exhibitions to Students at the Examinations for Junior Scholarships.

Scholarships and Exhibitions are tenable for One Year, and Candidates must have Matriculated.

Lectures can be attended by both Matriculated and non-Matriculated Students, and all Lectures, Scholarships, Exhibitions, and Prizes are open to Women.

Information as to Fees, and Copies of the Prospectus may be had on application to the Registrar.

By Order of the President,

EDWARD TOWNSEND,

Registrar.

1st August, 1906.

## CONTRACTS.

## TO BUILDERS.

Tenders are invited from competent parties for the erection of a gentleman's residence at Archersgrove, within one mile of the City of Kilkenny, in accordance with plans and specification, which can be seen at the offices of Messrs. W. M. Mitchell and Sons, Architects, 10 St. Stephen's Green, N., Dublin, or at the residence of the superintending Architect, A. M. Burden, Esq., M.Inst. C.E., Bellevue, Kilkenny.

Bills of Quantities for the work have been prepared by Messrs. Beckett and Medcalf, Surveyors, 10 Leinster-street, Dublin, copies of which may be obtained by depositing £1 is, with them, which will be returned on receiving a *bona fide* tender.

Tenders, accompanied by a priced Bill of Quantities, will be received at either of the above-named addresses up to the 18th day of September, 1906. The lowest or any tender need not be accepted.

## TO CIVIL ENGINEERS.

## PROPOSED SEWERAGE SCHEME FOR NEWCASTLE, CO. DOWN, IRELAND.

The Urban District Council of the above Seaside Resort invite Applications from Engineers for the preparation of Plans, etc., and necessary supervision for the carrying out of a scheme of sewerage with purification for the Township.

Applicants to state terms, qualifications, references, and experience of similar works to the undersigned on or before the 22nd September, 1906.

DANIEL CURRAN,  
Town Clerk.

## URBAN DISTRICT OF BANGOR, CO. DOWN.

## TO WATERWORKS CONTRACTORS.

The Urban District Council of Bangor (Co. Down) invite Tenders for the Construction of a Reservoir and Auxiliary Works at Ballysallagh Major, about four miles from the Town Hall, Bangor; also the laying of a line of 2-inch pipes from the intended Reservoir to Bangor Urban District Boundary.

Tenders to be framed as follows:—

Firstly—The Contractor to execute all work and to supply all pipes, iron-work, and other materials.

Secondly—The Contractor to execute all work and supply all materials other than the pipes and iron-work, which will be supplied to him at Bangor by the Urban District Council.

Thirdly—Ironfounders to supply and deliver at Bangor all iron and steel work, pipes, and valves, as described in Specification and Schedules.

Plans and Specification of the intended Works may be seen at the Office of Messrs. L. L. Macassey and Sons, 7 Chichester-street, Belfast.

Quantities for the intended Works may be obtained from Mr. S. C. Hunter, Scottish Provident Buildings, Belfast, from whom also a copy of the Specification may be had on deposit of £5 ss., which will be repaid on the return of the same.

The Council do not bind themselves to accept the lowest or any Tender.

Tenders, accompanied by priced Bills of Quantities, and Specification, to be lodged with me at the Town Hall, Bangor, not later than 12 o'clock noon, Tuesday, the 2nd October next.

By Order

JAMES MILLIKEN,

Town Clerk.

Bangor, 3rd September, 1906.

# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,

ARTS AND HANDICRAFTS.

Every Second Saturday.

[Estab. Jan. 1859.]

No. 19—Vol. XLVIII.

HEAD OFFICE

SEPTEMBER 22, 1906.

84 LOWER ABBEY ST.,  
DUBLIN.

Price 1d.

## TOPICAL TOUCHES.

A new residence in Co. Kildare for Major Aylmer has lately been completed by Mr. James P. Fife from the designs of Mr. R. Caulfield Orpen.

\* \* \* \* \*

Messrs. Kapp and Peterson's premises in Grafton Street are about to be re-built from the designs of Mr. George P. Sheridan, A.R.I.B.A., Suffolk Street, Dublin. The general frontage lines of Messrs. Dudgeon's and Messrs. Piggott's new premises will be carried on.

\* \* \* \* \*

A Dublin contractor tells us that he lately received for tendering a set of drawings and specification of a house. The architect's name which was subscribed to the drawings was "The Army and Navy Stores, Ltd., London." Messrs. Liberty and Co. are another firm who are now carrying on architects' work.

\* \* \* \* \*

There is no item of painting work more frequently a failure than white enamel finish. A committee of American experts have had the matter under consideration, and have drawn up a report, in which they summarise the results by saying that it is impossible to do a passably good job with less than four coats, while a first-class one requires at least eight coats.

\* \* \* \* \*

The Dublin Main Drainage Works will be opened by the Corporation on 24th inst., and the sewage of the city diverted into the new main sewer. A luncheon will be given under the presidency of Alderman Cotton, Chairman of the Improvements Committee, to mark the occasion. A number of plates or sluices to shut off the old outfalls to the Liffey have been manufactured by Messrs. Kennan and Son, Fishamble Street, and are being fixed in position.

\* \* \* \* \*

We publish in this issue some additional particulars of the "Fiddian Automatic Distributor" for sewage filter beds, a description of which appeared in our last issue. Messrs. Birch, Killon, and Co., 20 Cooper Street, Manchester, are the patentees. At Enfield, near London, it may be of interest to remark, there is in operation a circular "Fiddian" distributor in connection with a filter having an area of .18 acre, and purifying 250,000 gallons of sewage daily, without cost for power or attendance.

\* \* \* \* \*

The death of Mr. George Wooliscroft, of Hanley, at the ripe age of almost 82, removes one of the oldest members of the clay-workers' trade. He was head of the well-known firm of Messrs. George Wooliscroft and Co., the brick, tile, and terra-cotta manufacturers. Mr. Wooliscroft began life as a cabinet-maker and upholsterer. Later he became the landlord of an inn, and it was comparatively late in life that he was "blown by a side wind" into the clay-working industry. The new works of the firms at Etruria employ 400 hands. Mr. A. E. Blizzard succeeded Mr. Wooliscroft as chairman and managing director of the company some time ago, and is guiding its fortunes with much success.

According to those qualified to speak, the building trade in Ireland, though still very dull, shows some signs of improvement.

\* \* \* \* \*

Messrs. Joseph Pemberton and Son have begun the extension of the Church of Ireland Training College in Kildare Street from the designs of Mr. T. M. Deane, M.A.

\* \* \* \* \*

Almost for the first time on record, the annual excursion of the London Architectural Association, which this year was held at Stamford, was without a single representative of Irish architects, the only Irishman present being Mr. Harry Noblett, of Cork, an ever-welcome visitor for his genial, kindly, and typically Irish personality. He is not, however, an architect. Nevertheless, he was a worthy representative of the "ould country."

\* \* \* \* \*

It is difficult to assign a cause for the total absence of the Irish this year. They ever receive a hearty welcome, and were at one time almost the backbone in numbers and in regular attendance of the excursions. Years and years ago an exceptionally strong Irish contingent practically saved the excursion from being dropped owing to poor support by the Englishmen, while in 1897 at Lancaster, one of the first excursions we have personal recollection of, there were nearly a dozen Irishmen out of a party of about twenty-five.

\* \* \* \* \*

The falling away cannot be due to the centre chosen being lacking in interest, for Stamford district is a splendid one, particularly in church work, the grand Lincolnshire spires being amongst the finest legacies of English mediæval architecture, while to Irishmen in particular, who have so comparatively little of architectural interest, the educational value of the excursions is incalculable, not to speak of the delightfully pleasant nature of the trip. Possibly the recent successful excursion of the Irish Association to Kettering, coupled with the bad times in Ireland, account in some measure for the declension.

\* \* \* \* \*

Sir Theodore Martin, who celebrated his ninetieth birthday the other day, has been giving his views on matters in general to an interviewer. In particular he deprecates the tendency of modern elementary education to give a smattering of everything, a sound knowledge of reading, writing, and arithmetic being practically lost arts. Constantly, he says, has he received applications from youths desiring his interest on their behalf, and the writers could not put together a decently-worded letter, or even spell it correctly. The majority of architects and engineers will agree that from their experience of the average pupil and junior assistant, there is only too much reason to admit the truth of Sir Theodore's very severe criticism. It is unquestionably a fact that a few generations ago boys were better scholars as regards those particular and fundamental branches of knowledge than their sons are nowadays. The spelling-book has been supplanted in the elementary schools by what is called "science." The smattering of that branch of knowledge imparted is, every one knows, nearly valueless to the average boy.



In this issue we publish a special article on the use of mild steel for water pipes. We trust the particulars given may be of interest and service to our readers.

\* \* \* \*

A memorial to the Council of the Royal Institute of the Architects of Ireland has been signed by a number of Dublin architects, praying the Council to take steps to organise a deputation to the Corporation of Dublin with a view to having an architectural competition instituted amongst the Dublin architects for the new Technical Schools in Bolton Street. The last decision of the Corporation was that the City Architect should design the building, and we understand that Mr. MacCarthy and the Corporation expert in matters of technical education are at present in England on a tour of inspection of the latest technical schools.

\* \* \* \*

We understand that the Council of the Engineering and Scientific Association of Ireland have decided to signalise the coming Session by a new departure. It has been determined to give a course of lectures on "Engineering Jurisprudence." The lecturer will be Mr. Herbert Boyd, B.L., and the course will be inaugurated by Lord Justice FitzGibbon. The importance of this subject, one of the many in respect of which the engineer or architect has but imperfect educational resources, can hardly be over-rated. The energy and enterprise of the Council in arranging this matter is deserving of praise and support.

\* \* \* \*

Some sensational statements having recently appeared in the evening papers on the subject of the decay of the new stone in the Church of the Holy Trinity, or Christ Church Cathedral, from which one would infer that the whole fabric was about to collapse, we sought an interview with Sir Thomas Drew, LL.D., the Cathedral architect, the other day. Sir Thomas readily afforded us information on the subject, and, as we anticipated, his observations were reassuring. That decay has been going on for years is public property, the portions affected being the stonework of the "Roe Restoration," under the late George Edmund Street, in 1878. Street used Caen stone, in the belief that the old stone was also Caen; but such plainly was not the case. The old stone, which, on the whole, has weathered admirably, is a Somersetshire oolitic limestone of a much coarser and harder character than Caen stone. Although there is no reason to anticipate any danger, the process of decay in the Caen stone is going steadily on, and is now very extensive indeed, and indeed it is

a sad pity to see so much beautiful work absolutely rotting. We trust that it may soon be within the power of the Dean and Chapter to effect a radical cure.

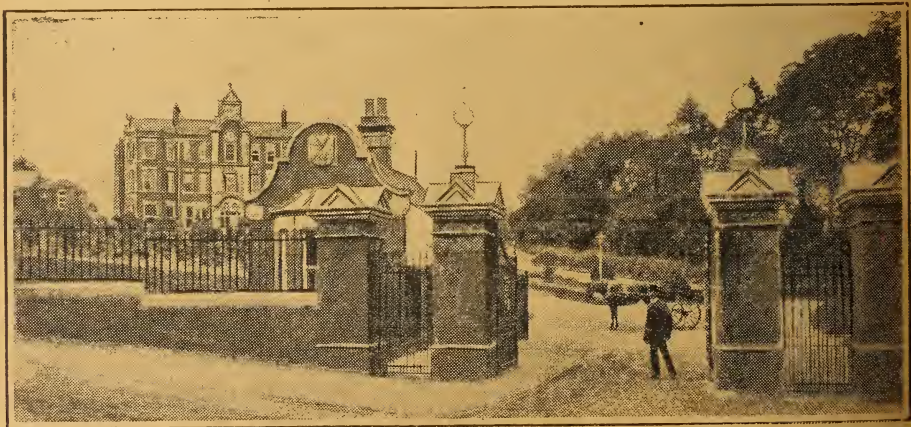
\* \* \* \*

In the last issue of the Architectural Association Notes, Mr. W. D. Caroe contributes a very interesting *in memoriam* notice of Mr. John Henry Christian, who has lately died at the age of 72. Mr. Christian was associated with his rather better known cousin, the late Ewan Christian, for very many years. The period of their connection practically covered the whole of the Gothic revival, and an immense amount of important ecclesiastical work passed through their office, Mr. Ewan Christian having been architect to the Ecclesiastical Commissioners, an office in which he was succeeded by Mr. Caroe. Mr. J. H. Christian was President of the Association in 1864-5, and very strenuous years they were amongst the then rising generation of architects. Speaking on the subject of architectural work of the revival, Mr. Caroe asserts that "the taste of to-day is not immaculate, and when it throws scorn upon that of the Revivalists, we make bold to assert that the greater part of what passes for the Gothic of to-day is as dross compared with the best, nay, the better, Gothic revival work of the seventies and eighties, and we repeat, as we began, other days (past or future), other men, other methods, and other tastes." "Who knows," he adds, "but that a time may soon come when the works and the workers of the Gothic revival may not find their imitators?"

#### THE INFECTIOUS DISEASES HOSPITAL, PURDYSBURN, BELFAST

We reproduce three views of the new Infectious Diseases Hospital at Purdysburn, Belfast, which has lately been completed. Messrs. Young and MacKenzie, of Belfast, were the architects.

Owing to the steady increase in business, R. J. Nicholson and Co. found the accommodation at 26 Cannon-street, Manchester, entirely inadequate, and they have taken extensive premises at Macdonald's-lane, Corporation-street. As soon as the necessary arrangements are completed, a show-room will be opened for the effective display of their "Ideal" lighting outfits, the extensive demand for which has been the principal cause of the removal. More favourable working conditions will enable Messrs. Nicholson to execute orders promptly, and they are now in a position to offer early deliveries of their petrol-electric sets.



THE INFECTIOUS DISEASES HOSPITAL AT PURDYSBURN.—THE MAIN ENTRANCE, SHOWING THE ADMINISTRATION BLOCK.  
Photo by the courtesy of Messrs. W. and G. Baird, Limited, Belfast.

**OUR SOUTHERN LETTER.**  
(FROM OUR CORRESPONDENT).

**Railways.**

The Cork, Bandon, and South Coast Railway Company, at an extraordinary general meeting, have authorised the directors, in pursuance of the powers conferred by the Cork City Railways Act, 1906, to subscribe towards the undertaking a sum not exceeding £15,000, and also sanctioned for that purpose the creation of £15,000 new four per cent. preference stock.

The Harbour Commissioners have also sanctioned the raising of the sum of £10,000 as their contribution.

These two sums make up the sum required to be raised locally to comply with the condition made by the Treasury before they would give £25,000 to the undertaking.

The Harbour Commissioners will be able to apply next year for powers to connect the deep water quays with the railways.

**Waterworks, etc.**

The Kanturk Rural District Council have applied to the Local Government Board for a supplemental loan of £1,700 in connection with the construction of the water supply of Kanturk.

The original estimate was for £5,000, and the engineer, Mr. G. A. Hickson, gave evidence to show that owing to unforeseen circumstances the original loan was insufficient. The supply is abundant and of pure quality, and the whole scheme is entirely successful.

The domestic water rate is 9d. in the £, and an extra charge of 10s. per annum is made for trade purposes.

The Cork Corporation now seem to have got their water supply into good working condition, and there has been no scarcity of water during the summer, although the new pumping plant is not yet completed.

The filter tunnel has been extended, and Professor M'weeney has reported very favourably on the samples of the water sent to him for analysis.

Mr. Merrick, of Warren's-place, Cork, has received the contract for supplying a pump valve chamber at a cost of £200.

In connection with the Youghal Auxiliary Asylum Water supply, Mr. W. F. Comber, M.I.C.E., of Dublin, was called in to report on the advisability of putting down another 6-inch main in connection with the existing Boola supply, and advised the Committee not to do so, but recommended that an independent supply should be obtained from Ballinray demesne by constructing a head well and laying a 4-inch

cast-iron main to the Asylum, a distance of five miles, at an estimated cost of £2,500.

In connection with the alteration to the sewerage at the Youghal Asylum, the Committee agreed to subscribe a sum of £700 towards the cost of construction.

The Cork City engineer has reported that to abate the nuisance caused by the sewage in the Blackpool stream, near the Church of St. Nicholas, would cost the sum of £2,500.

**Town Hall.**

After keen competition between the Cork Electric Tramways and Lighting Co. and the Cork Gas Co., the latter company have obtained the contract for lighting the new Town Hall, their estimate being for 8,960 candle-power at 11.6 pence per hour; this includes the necessary and auxiliary lights.

The contract for the seating has also been arranged, benches to be supplied at a cost of £444.

**Sanatorium.**

In connection with the proposed site at Myshal for the Sanatorium for Consumptives, Mr. Evans, C.E., reports that the cost of providing a suitable water supply would be about £1,265, and that the cost of sewage disposal works would be £460, including automatic flushing tank, fireclay pipes, septic tank, contact beds, and land for intermittent irrigation.

**OUR ILLUSTRATIONS.**

**The Belfast City Hall.**

In this issue we conclude our series of illustrations of the new City Hall. The reproductions include further views of the grand staircase, the Lord Mayor's dais and chair, finely carved in oak; an additional view in the courtyard, and two examples of the fine plaster work executed by Messrs. George Rome and Co., of Dublin and Glasgow, a firm exceedingly well known for the excellence of their work. The plaster work at the City Hall is, as may be gathered from the illustrations, quite a feature of the building, and is particularly good both in modelling and execution.

**Newtownmountkennedy.**—Messrs. Tomlin and Sons are just finishing a new altar rail at Newtownmountkennedy church, Co. Wicklow, according to the designs of Mr. Lucius O'Callaghan, 22 South Frederick-street, Dublin.



THE INFECTIOUS DISEASES HOSPITAL AT PURDYSBURN.—THE DIPHTHERIA SECTION.  
Photo by the courtesy of Messrs. W. and G. Baird, Limited, Belfast.



## CORRESPONDENCE

## The Ulster Society of Architects.

Letter from the Hon. Secretary of the Institute.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—In your issue of the 8th your correspondent, in his Northern Letter, has much to say in regard to the secession of the Ulster Society, so much, indeed, that I feel compelled to conclude that he is presenting a sort of "apologia" as an endeavour to explain the extraordinary course which the Society has adopted. I cannot suppose that the executive of the Ulster Society will be grateful to him for his untimely championship and total disregard to accuracy in the facts which he has produced in extenuation.

As the secession is now a regrettable *fait accompli*, it would be manifestly unprofitable for the Council of the Royal Institute to enter into any controversy in the Press; suffice it to say that the first intimation which my Council received from the Society in respect to its secession was a letter enclosing a copy of the resolution passed by the society, by which the alliance with the Institute was terminated.

In view, however, of the quite extraordinary inaccuracy of the many statements which your correspondent has put forward in support of the action of the Society, I feel that it is due to my council to at once contradict, at least, the most flagrant of these. I can unhesitatingly deny that when, some years ago, my Council took an active part in inaugurating the Society in Belfast, there was any understanding, documentary or otherwise, that the "affiliation with the Irish Institute was a preliminary, and to lead up, to affiliation with the Royal Institute of British Architects." The whole history of our Institute, which has since the year of its foundation represented the profession through the length and breadth of the land, would most certainly have precluded our Council, either collectively or individually, from conceiving such an idea.

The allusion to Mr. Gilliland's application for Fellowship of the Royal Institute of British Architects is so manifestly based on improper information, that I feel bound to state the facts. Your correspondent states: "Desirous of making some acknowledgment to one of our Presidents, Mr. Gilliland, for yeoman services rendered to us by him . . . the leading members of our Council approached the Irish Institute with a view to having Mr. Gilliland nominated for Fellowship of the British Institute." To our application, however, we "obtained no reply, so we went direct to the British Institute and obtained the Fellowship. No sooner was the result announced than the Irish Institute wired and wrote to the British Institute expostulat-

ing, much to the entertainment of the British Institute, I may tell you."

How grossly incorrect is this account of the transaction will appear when I state that the Ulster Society never "approached the Irish Institute with a view to having Mr. Gilliland nominated for membership of the British Institute;" that the first intimation my Council had of his candidature was the appearance of his name in the British Institute list of candidates for election; that my Council at no time made any protest against Mr. Gilliland's undoubted worthiness to hold this distinction, of which it is fully conscious; that the only protest made was one sent direct to the British Institute, pointing out that by omitting to submit the name of a candidate living within the province of an affiliated Society to the Council of that Society for approval before it is sent forward for election, it had transgressed one of its own bye-laws; and, finally, that the British Institute recognised that it had been in error as regards procedure, and asked my Council, through Mr. Belcher, its President, to overlook the lapse, undertaking that it should not occur again. Where the "entertainment" recorded by your correspondent arose I confess I fail to see.

It is absolutely untrue that the "Irish Institute wish our students to go forward for examinations to be instituted by them."

I shall not further pursue this unpleasant subject, being persuaded, as I stated at the beginning of the letter, that the Ulster Society cannot be held responsible for the opinions, so ill-supported by facts, expressed to, and recorded by, your correspondent, further than to give the most emphatic denial to the concluding statement in your correspondent's letter in which he deals with this matter—namely, that the institute ever rejected the candidature of Mr. J. J. M'Donnell, or that his name was ever sent forward for election to the Rank of Fellow.

In preparing a list, some months ago, my Council instructed me to ask Mr. M'Donnell if he would permit his name to go forward, with those of others, for election, and Mr. M'Donnell wrote to me courteously declining.

My Council is not at present in session, so this letter must be regarded as unofficial. I feel, however, that such grossly inaccurate statements as those I have dealt with should not be allowed to remain unchallenged.—I am, sir, yours faithfully,

R. CAULFEILD ORPEN,  
Hon. Sec. R.I.A.I.

[Note.—In justice to our Belfast correspondent, it is only fair to mention that he clearly stated that the views he set forth were not his own, but those of a number of members of the Ulster Society whom he interviewed for the purpose of eliciting an expression of opinion.—Ed. I.B. and E.]



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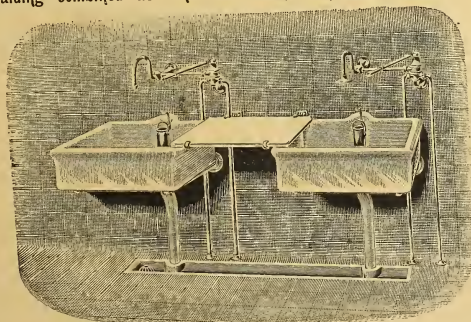
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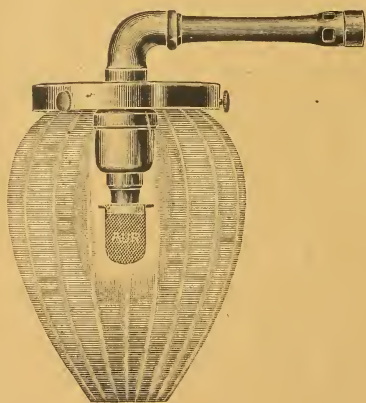
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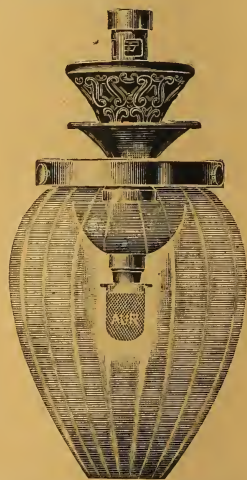
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# REVIEWS OF CATALOGUES.

Messrs. W. C. Bagnall, Ltd., Castle Engine Works, Stafford, England, forwarded a catalogue of their locomotives, turn-tables, rolling stock, tipping wagons, etc. This firm, who are one of the largest and best known of English engineering firms, are contractors to his Majesty's Government, the Admiralty, the Crown Agents for the Colonies, Foreign Governments, etc.; and have supplied locomotives and every description of railway requisites to all parts of the world. The catalogue is, for this reason, most interesting, illustrating as it does numerous types of locomotive engines, passenger carriages and wagons, as well as narrow gauge permanent ways, switches, turn-tables, cranes, weigh-bridges, and other requisites of complete railway systems. The introduction to the catalogue is devoted to an exposition of the possibilities of light railroads, and deals exhaustively with the various narrow gauges in general use at home and abroad, their adaptabilities to certain requirements, and the best type of engines suitable for them. The company makes a speciality of catering for narrow gauge railways, being thorough believers in the importance and utility of this type of railway work. But, at the same time, their catalogues shows that special attention is paid to the requirements of locomotives for the 4ft. 8½in., or what is termed in this country the standard gauge. It may be mentioned that they are also manufacturers of motor coaches of the type recently adopted by the Dublin and South Eastern Railway Company, late the Dublin, Wicklow and Wexford Company. These vehicles are a very useful acquisition for branch lines, and are lately much inquired for. The catalogue, which contains a number of useful tables, will be found a valuable book of reference to engineers and contractors interested in railway work.

The Bramley Engineering Company, Leeds.—This firm are specialists in machinery for working stone of every description, including granite, slate and marble. Their catalogue illustrates a great variety of machines adapted to this purpose, and including amongst others the following:—Channelling machines for the rapid opening up of quarries, and for their future working; derrick and travelling cranes, stone-breakers, mortar mills, stone saw frames, planing and moulding machines, rubbing beds, polishers, pneumatic dressing and carving plants, turning and polishing lathes, and machinery for slate dressing. They are also manufacturers of steam, oil and gas engines, including suction gas plants. One of the latest productions of the Bramley Company is their patent diamond circular saw for cutting stone or marble, and embodying a number of new principles which render it an almost indispensable adjunct in the yards of large contractors, builders and stoneworkers. In Portland, or stone of a similar nature, it will cut readily at the rate of 6 in. per minute. The saw is made in two varieties—over-driven and under-driven. In the over-driven saw the blade can be rotated in either direction, when the stone will be cut with the same facility. In the under-driven saw one or two blades may be employed, and each of these blades may be laterally moved along the shaft. The speeds of cut may be changed without stopping the mechanism. The gearing in both these machines has been made as simple as possible, with the result that the cost of upkeep is much less than is the case with other diamond saws on the market, and the initial outlay is also comparatively small. The over-driven saw possesses a very valuable feature, namely, that it will cross-cut to any length. The method employed of fitting the diamonds is very secure, so that there is no chance of their working loose. The catalogue can be had on application to the firm.

# REVIEWS.

"The Inventor's Primer," by C. F. Ennis, registered patent agent, Jessel Chambers, 88 Chancery-lane, London, W.C. This is a very useful little publication, giving in a short space a great deal of information as to patent laws

at home and abroad, and the procedure that has to be followed when application is made for patents. About half the book is occupied with British Patent Law and Practice, and chapters are added dealing with registration of designs and the protection of trade marks. The rest of the book sets out the conditions under which patents are granted in the Colonies and in foreign countries, in Europe, America, Asia, Africa, and Australasia. A scale of the British charges for patents, designs, and trade marks is added. The booklet, on account of its size, is not exhaustive, but the author will be pleased to supply any further information that is needed. The publishers are Messrs. Walter Johnson & Co., Ltd., 67 and 68 King William-street, London, E.C., and the price is only sixpence.

Messrs. The Yorkshire Hennebique Contracting Co., Ltd., have sent us a most interesting album of views of buildings, bridges, wharves, etc., in course of erection on the Hennebique ferro-concrete system, prefaced by a chapter on the principles underlying this method of construction, by L. G. Mouchel, Esq., general agent in Great Britain and Ireland for the Hennebique patents. The book is beautifully produced, and is well worth writing for. The address of the firm is East Parade, Leeds.

# BOOKS RECEIVED.

"Cements, Limes, and Plasters: Their Materials, Manufacture, and Properties." By Edwin C. Eckel, C.E., Associate American Society of Civil Engineers, Member Society of Chemical Industry, Assistant Geologist, U.S. Geological Survey. First edition, first thousand. New York—John Wiley and Sons. London—Chapman and Hall, Ltd. 1906.

"A Practical Treatise on Foundations," explaining fully the principles involved. Supplemented by articles on the use of concrete in foundations. By W. M. Patton, C.E., late Professor of Civil Engineering at the Virginia Polytechnic Institute. Second edition, enlarged; first thousand. New York—John Wiley & Sons. London—Chapman & Hall, Ltd. 1906.

"Concrete Block Manufacture: Processes and Machines." By Harmon Howard Rice. First edition, first thousand. New York—John Wiley & Sons. London—Chapman & Hall, Ltd. 1906.

# THE WORLD'S TIMBER SUPPLY.

As bearing indirectly on the question of re-afforestation, and the possibility of the scarcity of timber in the future, the report recently issued by the Agricultural Department of Washington is instructive. It would appear that the timber resources of the United States are being rapidly depleted. The annual cut continues to be enormous, whilst the waste caused by forest fires continues to be great. Last year the timber cut in the States amounted to 27,738,000 cubic feet. It is stated that the Oregon Forests are being cut into at the rate of 1,000,000 cubic feet per day, the mills running day and night, and also on Sundays. The former great timber States of Maine, Michigan, and New York are now low on the list as timber producers, and it is stated that the white pine of the United States is practically gone. Last year only 3½ per cent. of the total cut was white pine, and hemlock, poplar, and bass wood, once only considered as good enough for firewood, have now to be used largely as substitutes. Not long ago President Roosevelt dealt at length with the scarcity of American woods generally, and suggested as a remedy better management, increased planting, and the stoppage of exports. Nearly every continental country is working on the same lines, and the consequences at no very distant date will be keenly felt. All these things point to the fact that the prospect of scientific and extensive planting in these countries proving a paying investment is decidedly good. The question that naturally arises is, when will the Government wake up to practical recognition of the obvious facts?



## THE OLD IRISH PARLIAMENT HOUSE.

## Some Interesting Particulars of its Early History.

Last week the "Evening Mail" published a very sensational statement *apropos* of the impression which has lately been gaining credence that Sir Antony MacDonnell's now famous speech at the dinner given by the Dublin Master Builders to the National Federation of the Building Trades Employers of Great Britain, held in Dublin last month, foreshadowed some form of Home Rule or Devolution. Sir Antony for the second time chose a Dublin Master Builders' dinner to give the first inkling of epoch-making measures of first-class political importance, the former occasion being that on which he indicated the intention of the late Government to introduce the great Irish Land Purchase Bill of 1903. The "Mail," in the article to which we refer, made the startling statement that it was the intention of the Government to acquire the Old Parliament House, now the Bank of Ireland, as a home for the proposed Irish Legislative Council. It will be remembered that the general belief is that when the Parliament House was sold to the Bank, there was a right of resumption or pre-emption reserved, and doubtless this could, if thought desirable, be now exercised by Government. Many sentimental reasons point to the Old House as the home which those in favour of Home Rule would of all others most desire. Since the appearance of the article, the governors of the Bank have given a denial to the rumour that there had been any move to this end on the part of the Government. Of course, right of resumption or no right, if the political principle involved were admitted, compulsory powers of acquisition could easily be given by the Imperial Parliament. The "Mail" added to the statement some interesting particulars of the old House, which has a most interesting history, and was practically the first of that fine series of noble Renaissance buildings erected in Dublin during the last quarter of the eighteenth century. The first stone of the building which was afterwards to become so historic was laid on the 3rd February, 1728, or 1729, and the first session of Parliament in the new edifice commenced on the 5th October, 1731, Lionel Sackville, Duke of Dorset, delivering the speech from the Throne as the Lord Lieutenant of the day. The last sitting in it of an Irish Parliament prior to the consummation of the Act of Union was on the 2nd October, 1800. The building was used for the holding of exhibitions of paintings in 1802 and 1803, and during the panic attendant on the rebellion of Robert Emmet the old Parliament House was converted into a barrack. In the succeeding year it had a second narrow escape from destruction by fire, which broke out beneath the front portico, injuring it so severely that it became necessary to insert large pieces in several of the columns. Thomas Elrington, D.D., proposed that the Government should grant the vacant building to Trinity College to be converted into lecture halls. To this proposal the objection was raised that disturbances might arise between the citizens and students in the passing of the latter between the two edifices, to obviate which the construction of a connecting tunnel was suggested. The scheme, however, never took effect, and ultimately the Parliament House was purchased by the Bank of Ireland for £40,000, subject to the ground rent of £240 per annum. An Act of Parliament was passed in June, 1802, to enable the Lord High Treasurer, or Commissioners of His Majesty's Treasury of Ireland, to sell, lease, convey, or dispose of the Parliament House to the Governor and Company of the Bank. The directors of the latter offered a prize of £300 for plans for the adaptation of the building, and this was won by Henry Aaron Baker, Master of the Dublin Society's Architectural School. The first stone of the new works, under the superintendence of Francis Johnston, was laid by the Lord Lieutenant, the Earl of Hardwick, on the 8th March, 1804, and the edifice was first opened as the Bank of Ireland on the 6th of June, 1808, the business having been transferred from St. Mary's Abbey, where it had its first foundation. The design is popularly attributed

to Edward Cassells, a German, who was also the undoubted designer of Leinster House, now the premises of the Royal Dublin Society. At the time, however, one Captain Edward Lovett Pearce was recognised as the architect; certain it is that Pearce was commissioned to do the work, and at the opening ceremony was knighted by the Lord Lieutenant. Pearce is now generally believed to have been an officer of Royal Engineers, or Sappers and Miners, as that distinguished corps was formerly known as; but as a matter of fact he was not, being a captain in a regiment of infantry of the line. That an Engineer officer of the ordinary stamp could have designed so clever and noble a building would seem to be improbable; still more unlikely that a young officer in a marching regiment, as Pearce really was, could or would have essayed so formidable a task, and have carried it to so successful an issue. The most probable conjecture is that, having through influence secured the work, he farmed it out to Cassells, who, as his work in Leinster House evinces, was a most accomplished designer. Pearce, however, was the son of a General Pearce, and had considerable political influence, which possibly accounts for his being entrusted with the work, poor Cassells fulfilling the obscure and humble position of "ghost." But that he was a ghost who walked to some purpose is clear, for inside and out it is a beautiful building, of classical dignity, adding much to the architectural importance of the capital—in fact, it is difficult to picture Dublin and College Green without "the Bank." The exterior has noble lines; being entirely without windows the lighting problem was one of some difficulty, but one which was cleverly overcome.

The present cash office was the old House of Commons, the chief change made being the removal of the gallery. The fine candelabra or central chandelier of elaborately-carved oak is in Trinity College. The House of Lords, now the Board-room in which the court of Directors holds its meetings, is practically unaltered, a statue of George III., however, replacing the throne. Some other articles of interest passed into the possession of Speaker Foster. The fine corridors, with their red and white diagonal stone paving, have a good appearance, and as a whole the building shows that brief period of brilliant Irish Renaissance architecture at its best.

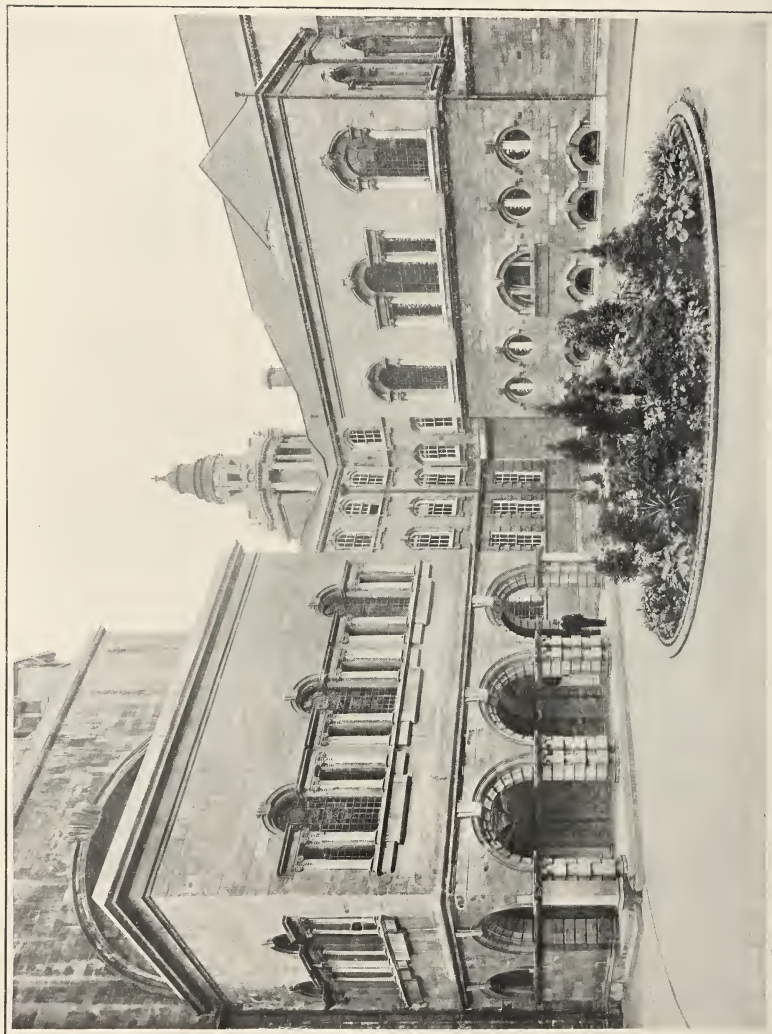
The portico in Westmoreland Street, which, viewed from College Street, has a scarcely less noble aspect than the main structure, was subsequently added by James Gandon, as an entrance to the House of Lords. Gandon has been often criticised for not carrying through the Ionic order of the main façade, and for adopting the Corinthian order, it being regarded as a mere whim; but it was the exigencies of the levels, and the necessity of continuing the cornice and entablature at the one level, which dictated this departure.

## PROTECTIVE COATINGS FOR IRON AND STEEL.

The statement was made a few months ago by an eminent engineer that no material had ever been invented which would effectually preserve iron and steel from the corrosive effects of the atmosphere. Of course, this must only be taken as applicable to materials applied like paint to form a protective coating, for we all know that Portland cement, in the form of grout, mortar, or fine concrete, is an absolute preservative if of good quality and properly applied, and that iron can be efficiently protected by the deposition of other metals upon its surface so as to form an impenetrable layer. But none of the various paints available afford permanent protection, because all of them are more or less porous and corrosion goes on beneath the coating. In a paper read before the "American Society for Testing Materials," Mr. Arthur B. Harrison describes some remarkable results obtained from experiments with a coating consisting of a mineral wax—akin to ozokerite—dissolved in a suitable medium. The author states that the material is not only impervious to air, but appears to have so phenomenal a bond and affinity with all ferric compounds that it displaces moisture and destroys any rust that may have been present on the surface of the iron covered. We should very much like to hear more of this new preservative, and after a further lapse of time to learn whether the objects coated by the author are still free from corrosion.—"The Builder."

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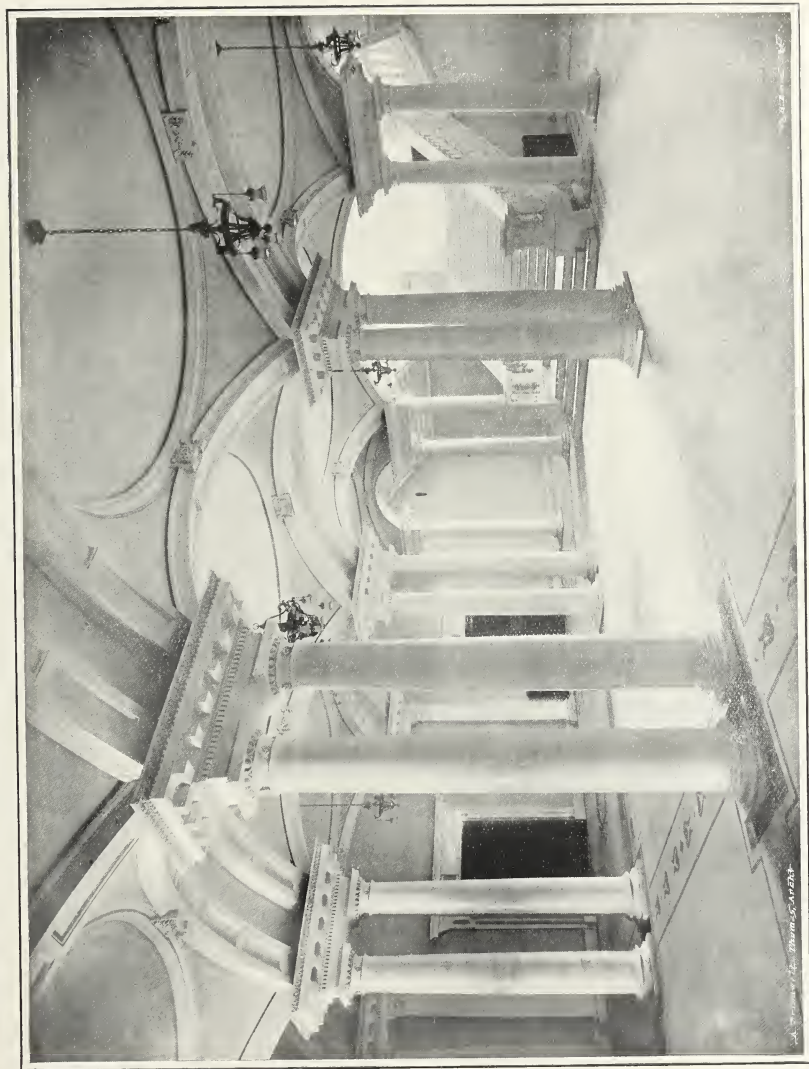
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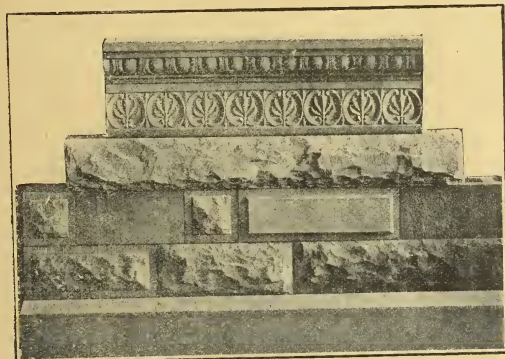
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SEPTEMBER 22, 1906.

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## A NEW BUILDING MATERIAL.\*

The present is an age of "new materials"—steel, concrete, or the two combined, all sorts and descriptions of patent materials, compositions, etc. The architect may or may not like these innovations. They may grate upon his artistic feelings; but many have come to stay. The use of concrete-steel, for example, initiated and developed as it was in France, the United States, and elsewhere, and quite unknown but a few years ago, was not adopted in Great Britain until long afterwards, and even now by no means fills anything like the position it does in America; still it is coming more and more into general use, and to-day there is hardly a new building of any importance in which it is not used—in, at all events, a limited fashion. The architect may deplore its use for external walls, but it has found favour, and he must simply console himself with the thought that probably, nay, certainly, it has its own form of artistic treatment, which will in the process of time be gradually evolved and developed.

Of a somewhat kindred character, but as yet hardly known in Ireland, is the system of building with cast concrete blocks, more or less imitative of stone construction and form. We can only recall having seen one instance of its use in or near Dublin, and that is in some new houses now being erected on the Rock Road. Next to reinforced concrete, the use of concrete blocks is perhaps the most novel and important application of concrete to building construction; but so far as this country is concerned, but little seems to be known of the method as is evinced by its sparing use, and while of late there has been a considerable amount of literature produced on the subject of concrete, still comparatively little has been written on the other. Some time since "The Engineering News" and "The Cement Age," of New York, offered prizes of 250 and 100 dollars for the best essay on the subject.

The two papers to which the prizes were awarded, together with extracts from others submitted in competition, have been published in book-form, and collectively form quite a treatise on the subject.

The first prize was gained by Mr. H. H. Rice, and in his essay is contained much useful information and sound thought. Speaking of concrete, he says the underlying principle is that every particle of sand shall be thoroughly coated with cement, and every piece of gravel or broken stone thoroughly coated with the mixture of sand and cement. If these principles are followed, we get something which can stand on its own merits.

Mr. Rice tells us that the colour of the sand used is of prime importance, as by means of a good white sand quite a beautiful surface appearance can be obtained.

Mixing is next dealt with as being also of fundamental importance. A proportion of 1-2-4 yields good results, and in some cases 1-3-5 may be used. Where, however, broken stone cannot be used, the proportion should be 1 cement to 4 sand. Compressive strength depends upon the filling of voids. The author favours power mixing in preference to hand mixing.

In manufacturing the blocks some makers use tamping, others compression, which latter, it is claimed, gives a more uniform density.

The machines used for manufacturing the blocks may be either:—

1. Upright machines for making hollow blocks.
2. Hollow blocks on the side.
3. Staggered blocks.
4. Machines operated by wet process.

The first machine consists of removable hinged sides and upright interior cores. The second class of machine is similar; the face surface is first put in and stamped and the filling added, the object being to put in a different class of face work. The third class eliminates the straight cross partitions of the first two, and so disposes the cores that a "staggered" effect is produced.

In the fourth a totally different process is used, a large number of light iron moulds being adopted.

Into these a wet mixture is poured and allowed to stand for several hours. The makers of these blocks contend that they are waterproof and cheap.

After they are cast, the blocks must be carefully "cured." Every part of the block must have the same treatment, and be sprinkled at regular intervals, never being allowed to become dry enough to turn white. The blocks should also be protected from the sun, and should not rest in contact with one another while being cured. Blocks made by dry process require twenty days' careful curing. Blocks made by wet process contain an excess of water, and consequently need little or no sprinkling.

A great deal of useful information is given in the treatise we quote from as to the manufacture, and some details of cost. The writer warns us that while concrete blocks can be put into a wall cheaper than any other material of equal quality, yet cost is not everything. It is obvious that in a country such as this, where in most districts stone or brick are fairly cheap, concrete blocks have little to commend them. If thoroughly well made they may be, and doubtless are, a fine building material; but it seems to us that there is no mode of construction more open to abuse than this, as everything depends upon care in the manufacture. While for common work the blocks appear to have no advantage over ordinary concrete, and can be more readily superintended, it would seem to be a risky thing to entrust the making of such blocks to doubtful contractors. They should be bought only of established manufacturers with a reputation to maintain. In districts where brick or stone are difficult to procure, or the site difficult of access, a speculative builder might find concrete blocks of economic and practical utility, if ordinary concrete did not meet his requirements; but we think the day for their general use has not yet come in Ireland.

\* "The Manufacture of Concrete Blocks and their Use in Building Construction." By H. H. Rice, William M. Torrance, and others. London: Archibald Constable and Co. 1906.

## COMMENTS.

### Architects and the New Labourers Act.

Our readers will remember that at the instance of the Chief Secretary a clause was added to the Bill setting forth that every person employed as an architect, engineer, surveyor, or clerk of works in connection with work done under this Act, should satisfy the Local Government Board of his capacity and experience necessary for such work; and we venture to say (despite the fact pointed out by our contemporary, the "Builders' Journal," that the judgment of the Local Government Board is not an ideal or even desirable mode of testing and pronouncing upon an architect's qualifications) that still it was a step in the right direction, a first instalment towards statutory registration, and a meed of justice towards members of a rather ill-used profession, which had been much preyed upon by quacks. That this was not a mere "trades union" question, but also intimately concerned the public, was speedily seen by Mr. Bryce. Some little controversy arose as to who should be given the credit for securing this act of justice, our Belfast correspondent stating it was due to the action of a firm of Belfast architects who happen to be related to Mr. Bryce. As we pointed out in our last issue, the principle embodied in this clause has been urged in season and out by many architects. The engineering officials of the Local Government Board, who, of course, were consulted on the professional details, are well known to have favoured it, and many months ago a well-known Dublin architect addressed a long and detailed, but unofficial, letter to a highly-placed officer of the Board, covering the whole ground, and especially urging this clause, emphasising the many difficulties which arise, the grievances of architects in regard to want of any sort of security of tenure, the cost and construction of cottages, the difficulty of securing good contractors, and the scandal of slow procedure and outrageous law costs; and it was further well known that the officers of the Board were in full agreement with the greater part of these views. Practically every suggestion put forward has been embodied in one shape or another, as, of course, they were not the mere views of one man, but represented the opinion held by all those best qualified to judge. The same views have been consistently urged by the Society of Architects in London, that the Bill first appeared without this clause was due to the dislike of the Irish members to the Local Government Board exercising what they thought undue control over the freedom of action of elective assemblies; Mr. Bryce's subsequent action in reinstating the clause followed immediately on the vigorous action and protest of the Royal Institute of Architects in Ireland, and Lord Monkswell's strong speech in London. To these, together with the sympathetic feelings of the professional officials of the Board, architects, we feel certain, owe this concession. The whole matter was well thrashed out long before the present Government came into office, for the Labourers' Bill has been in contemplation for a considerable time past.

### The New Regulations.

Under the Act the Local Government Board is empowered to frame regulations dealing with the administration thereof. These regulations have now been issued in draft form, and very wisely, in order to avoid any friction, the Board have submitted them in this form for the consideration of the District Councils, who will have to administer the Act. They are voluminous, and bear signs of close and careful reasoning by persons well acquainted with the work; they are practical, tending to economy and efficiency, favourable to qualified architects, and go as far as is practicable to suggesting, if not dictating, adequate remuneration to them. The legal formalities are simplified, the "red-tape" being largely eliminated, while the solicitor's part in the framing of schemes is reduced to a minimum.

The following are the clauses relating to architects:—

48. (1) The following persons shall be deemed eligible for employment as Architect, Engineer, or Surveyor:—

- (a) Fellows, members, or associates of any recognised association or institution of architects or civil engineers who have been in practice for two years;
- (b) County surveyors;
- (c) Persons who have a Diploma or Degree in Engineering from a University or College of Science in the United Kingdom, and have had two years' experience on works;
- (d) Assistant county surveyors who are certified by a county surveyor to be possessed of a sound knowledge of architectural building construction;
- (e) Persons who have been trained for not less than four years in the office of an architect or civil engineer in good practice, and have had responsible rare of works of importance; and
- (f) Persons who by examination or the production of testimonials or other evidence can satisfy the Board that they have sufficient knowledge and experience for such employment.

(2) In addition to the persons qualified as aforesaid, the following persons shall be deemed eligible for employment as Clerk of Works, to act under the direction and control of an architect or engineer with respect to supervision of works:—

Builders' foremen, building tradesmen, or persons who have acted as Clerk of Works, and who possess satisfactory testimonials as to competency, character, and general fitness for the post.

49. The District Council may employ a competent person to act as architect, engineer, or surveyor for the purposes of an improvement scheme, and may pay him for his services as follows:—

- (a) For marking plots on Ordnance Survey Maps at a rate not higher than — per plot for each plot not included in the scheme as confirmed, and at a rate not higher than — per plot for each plot which may be acquired, such payment not to include the cost of the maps, which shall be supplied gratis by the Council.
- (b) For all other work, at a rate not higher than — per cent. upon the cost of the work executed in accordance with the contracts for building and fencing.

The rates to cover preparation of all maps, plans, and specifications that may be required; attendance at the Enquiry by the Inspector, if required; not less than six visits to each cottage during course of construction; the making of a monthly report to the Council (on Form No. 32 in the Schedule) in regard to the progress and execution of the work; the issue of certificates (on Forms No. 33, 34, and 35 in the Schedule) for payments to contractors and as to completion of works; accompanying when required the Arbitrator and Engineering Inspector of the Board on his inspection of the works, and all other works required to be performed by the engineer or architect for the effectual carrying out of an improvement scheme.

Provided always that:—

(1) The District Council may, subject to the approval of the Board, employ a competent person to perform the aforesaid duties for a bulk sum or a fixed fee per plot acquired.

(2) This rule shall not in any way interfere with any agreement in force between a District Council and any person for the performance at a fixed salary or other rate of payment of the engineering and architectural work in connection with improvement schemes under the Acts authorised prior to the making of these Rules.

50. The District Council may, subject to the approval of the Board, employ competent persons to act as Clerk of Works, under the direction and control of the architect and engineer, subject to such conditions as to period of employment and rate of remuneration as the Board may approve.

These clauses are admirably drafted and leave little room for criticism.

We might suggest that in clause 48 section 1 paragraph (a) "associates" might be more clearly defined as "professional associates," as some societies, for instance the Institution of Civil Engineers, have a third class of members known as "associates," who are not necessarily professional engineers or architects, and who may be simply persons of other callings interested in engineering. In the case of the Institution referred to, these gentlemen are not corporate members,



and have no power of voting. We think the clause would be more definite if it read as follows:—

(a) Fellows, *corporate members, associate members, or professional associates* of any recognised professional association or institution of architects or civil engineers who have been in practice for at least two years. The words printed in italics are suggested additions to the clause.

We qualify the expression "Association" by saying "*professional Association*," in order to differentiate such a body as the Architectural Association of Ireland, many members of which are only students, and some are sculptors, etc. Membership of such a body is not regarded, and does not claim to be, any test of a man's professional capacity, and should, therefore, not be admitted as a qualification.

In paragraph (c) graduates in engineering of a university are placed on the same level as persons holding a certificate or diploma from a college of science, and both are expected to have two years' experience on works. Colleges of science do not usually deal with building construction, or civil engineering, on as practical or thorough a basis as, for instance, the engineering school of T.C.D. A distinction should be drawn, and persons holding such certificates or diplomas should be required to have three years' experience on works or in the office of an architect or engineer in good practice.

In paragraph (d) assistant county surveyors are admissible, provided they "are certified by a county surveyor to be possessed of a sound knowledge of architectural building construction." This should, in our opinion, be altered to read, "who shall satisfy the Board," etc., or else be eliminated, and the class of persons referred to dealt with under paragraph (f), as many county surveyors do not themselves lay claim to such knowledge, and hence can hardly certify to another man's knowledge.

Finally, in clause (f) persons are admissible "on the production of testimonials." This is rather vague, and should read, "testimonials of study or apprenticeship and experience."

Scarcely less important than architects' qualifications are those of clerks of works. The clause as it stands appears excellent, and guards somewhat against the "handy man," or more frequently "handy botch," who is occasionally employed, to the detriment of the ratepayers and the tenants.

A very useful clause is No. 61, which is as follows:—

61. (c) The District Council shall obtain, at regular intervals of not longer than six months, reports from the architect, engineer, or clerk of works employed by them, setting forth the state of repair and condition as to painting of all the cottages provided under the Acts, and the Council shall forthwith take such action thereon as the circumstances may require to ensure the maintenance of the cottages in proper condition and repair, and that all wood and ironwork shall be painted once at least in every three years.

All works of repair and painting shall be done by contract, in accordance with specifications prepared by the architect, engineer, or clerk of works, on whose certificate all payments shall be made.

Very frequently cottages once built are left neglected, to the detriment of the work. Everyone knows that a newly-built house needs re-painting within a few years to preserve the wood-work.

#### The Board's Views.

In forwarding the draft regulations to the Councils for consideration, the Board add a letter, enclosing copy of the Act, and new general regulations. The Local Government Board in their letter stated that they had tentatively prepared the draft rules for the purpose of eliciting the views of the Rural District Councils and other persons interested upon the various points which, as at present advised, they considered may be dealt with in the regulations. In framing the draft rules and forms the Local Government Board had been animated by the desire to simplify the procedure, and to cheapen the cost, while securing the more expeditious

working of the Act, and they thought that the first and most important work in that respect was to entrust the carriage of the improvement scheme to the clerk of the Council, and not to employ a solicitor, except in relation to strictly legal work, or business requiring the intervention of a solicitor, such as appearing on behalf of the Council at the inquiry before the Inspector and Arbitrator. The draft rules contemplated the fixing of scales of remuneration for the services to be rendered by clerks of district councils, collectors of rents, medical officers of health, architects or engineers, solicitors, arbitrators, and shorthand writers, and also the amount of costs to be allowed in respect of the successful opposition of persons interested at the inquiries to be held by inspectors and arbitrators.

In a further letter the Local Government Board stated that the main feature of the Act, which comes into operation on the 1st November next, was the marked improvement made in the terms for the repayment of future loans. Under the terms now in force the lowest annual charge covering principal and interest on a loan was £4 17s. 2d. for every £100 advanced; but under the new Act the amount would be reduced to £3 5s., or one-third less than the existing charge. The relief afforded to the ratepayers would, the Board trusted, act as an incentive to the rural district councils to exercise the powers conferred upon them by the Acts for the benefit of the labouring class.

Forms of certificate and report are added to the regulations, and the architects' work is systematised and undoubtedly increased, as he has a certain amount of accounting to do, and has to make monthly reports and returns to the Council.

In the certificate form there should be a space for amount of former added to present certificates making complete the "carry forward."

Generally speaking, the regulations, while open to some revision, are practical and clear, though the forms to be kept by architects seem somewhat unnecessarily involved.

The regulation which ordains that the architect must make a monthly report to the Council is rather too stringent, and might well be made to read once in every two months. Take a large union, for instance, with a scheme of, say, 70 very scattered houses in progress. The probability is that such would take six days' constant driving to inspect, so that the architect in charge would, between inspecting, certifying, keeping accounts, and making reports, have to devote at least half his entire time to the work. If a man knows his business, a really careful inspection once in every six or eight weeks should suffice, particularly if a clerk of works he employed. In any event, in fixing remuneration the Councils should take into consideration the fact that the architect's work and responsibility is greatly increased by the new regulations. An all-round fee of 4 per cent. on the outlay should be a minimum rate.

In the clause dealing with designs it is made mandatory that the Councils shall build according to the designs furnished gratis by the Local Government Board. This should at least be optional, and the clause might be made to read that Councils shall build in accordance with the designs furnished by the Board, or approved of by them. The circumstances of different localities vary so much that a cast-iron uniform type is undesirable. Some districts of a semi-suburban class demand a better-looking type of house than others in order to avoid lowering the value of adjoining rateable property. Other districts, again, desire to give labourers more bedroom accommodation than others, while some might wish to add a little scullery, a most desirable adjunct wherever practicable.

#### The Corporation Working-Class Dwellings.

In Monday's "Freeman's Journal" Rev. Father Behan, of Harold's Cross, severely criticises the Dublin Corporation dwellings. Father Behan is very trenchant. He says that in every case the Corporation have built the

wrong class of houses. Instead of a comfortable little cottage, with two or three rooms and a large garden out in the suburbs, which are what the people really need, "they get from the Corporation an elaborate barrack, where the people are on top of one another, solid as a fortress, not an inch of garden, in the suffocating, regenerated slums, not forgetting the water-closet just beside the dinner table!" The cost is, he says, absurd. Private enterprise, says Father Behan, has gone much nearer to solving the problem. He states—and it is difficult to credit that he can be rightly informed—that the White's Lane cottages, which come nearer to his ideal, but have not an inch of garden, actually cost £325 each, and, adds Father Behan, any man could build them with his own money for £108 6s. 8d., or one-third the actual cost. How this supposition is arrived at we know not; but it is a fact that but a very poor cottage can be built for that sum, and for that, too, he says, it should be possible to give a good garden as well, but not in the slums. This, of course, goes to the root of the difficulty, for Father Behan is wholly opposed to slum purchasing, observing that "the Corporation should buy up all the slums, which is impossible, or let them all alone. It is not fair to pick out a particular slum and pay a fabulous price for it at the expense of the taxpayers, including the owners of other slums whose property is without value. And worse than buying the slum is it, after clearing away the slum, to put down the slum again in the same place with merely newer bricks and mortar." The great difficulty is to know what to do with the slums. Three courses are open—First, to let them absolutely alone; that is not in accordance with modern ideas either of sanitation or of the duties of municipalities; if persisted in such a course would end in Dublin becoming a city of slums. The next alternative is to buy them up, and, as Father Behan says, build "another slum," but of a better and more sanitary character, healthful, and with new materials. This is what the Corporation have done, but it is, as he points out, a costly procedure. The prices demanded for vested interests are outrageously high. We are wholly with Father Behan in his view that "it is a poor case that a great popular body are making such a muddle of housing the people, and that in this land of 32,000 square miles, with less than 1,000 square miles built on, the people cannot get anywhere to live except gloomy barracks with hermetically-sealed boxes for rooms, with a water-closet thrown in—in every sense a prison, except that the outer door is open to the street." And we agree that there is no possible justification for building in Dublin the prison-like dwellings such as the Bride's Alley scheme. The congestion of the city is not nearly sufficient to warrant it, and, besides, such big buildings are of necessity extravagant to build and to maintain. The question of rent is urged, but a cottage could surely be built for a sum which would enable it to be let at a rent within the means of a poor man, and the new tenements, or "model dwellings," as they are sometimes humorously called, are by no means so very cheap.

There is the third alternative: to apply the sanitary laws vigorously against the owners of unwholesome tenements, for they are only profiting by the misfortunes of others, and to at the same time build cheap cottages on cheap land anywhere outside the city. But here again comes in a further difficulty—the poor man with his long hours of labour and small income cannot well afford even rd. trams, and he must be near his work. But not all those people who inhabit the big prison-dwellings work in their immediate vicinity, and much might be done by an intelligent system of town migration. This much is true: that this last alternative has more of the ideal conditions about it than either of the others, and is the one which should be most anxiously aimed at. The object of housing people is two-fold. As a matter of pure mercy, its first purpose is to take people out of very miserable and unwholesome surroundings. Its next motive is, however, the

broader of the two. It is to encourage a better, cleaner, more healthy home-life, such as will conduce to producing good citizens. It also affects the more well-to-do by removing causes of discontent amongst the poor and centres of infection. Now, the big dwellings perpetuate the tenement-house system. They have in them every element to take from the attractions of home. A working man finds in them nothing to induce him to stop at home; rather the contrary. A man should be more than human if he did not long to get out of them of an evening. Father Behan is very severe upon the sanitary arrangements. Says he:—"If the Corporation will build hideous barracks for the people, why could they not put up one row of water closets for the men and boys, and another for the women and small children? This extraordinary water-closet arrangement is worthy of the Corporation, which, in its modesty run mad, causes the greatest inconvenience and suffering, to women residents and visitors, by refusing to provide any public accommodation." The experience of those who have had much to do with such matters is wholly in favour of separate sanitary accommodation. Where sanitary accommodation is used in common it is a danger, because it is abused and invariably kept filthy, it being everybody's business and nobody's in particular. On this point we disagree, though reluctantly, with Father Behan. In considering the tendency of the Corporation to perpetuate the tenement-house system, for that is what it amounts to, he suggests that "why this building is all wrong is not a mystery. If there is a slum area to be worked off on the city, the slum owners begin their pressure on the members of the Council, who are their friends. Then the whole army of philanthropists and hygienists, bricklayers and carpenters, licence-holders, and 'others' prove to their own satisfaction that the slum must be removed, and it must be replaced by another in the very same place, no matter what the cost may be. That the city is impoverished, and that the cost falls entirely on the poor, is not worthy of notice by the noble-minded men who take such an interest in housing the people."

The question raised by Father Behan is certainly one worthy of the most serious consideration. A very large number of the type of dwellings he so strongly objects to have already been erected. Is it not worth while considering whether the time has not come to initiate a better system?

#### Blackrock Drainage.

A memorial signed by numerous ratepayers has been prepared, urging the Urban Council to remove a certain open sewer which causes a serious nuisance in the People's Park, and which, it is alleged, will inevitably produce an epidemic if not amended or removed. The sewer in question is part of the system under the care of the Joint Drainage Board, and we understand that some system of sewage pumping is in contemplation.

In a long letter to the papers, Mr. Laurence Wickham, of Blackrock, a past member of the Drainage Board, discusses the situation. It is not quite easy to follow Mr. Wickham's detailed criticisms; but he remarks that "it is no doubt generally agreed that the idea of storing the joint sewage of Kingstown and Blackrock in a sealed tank and discharging it a mile out at sea with the ebb of tide is an excellent one; but the terrible blunders that were made to get the Blackrock sewage to Kingstown have up to now set at naught the whole virtues of the scheme. Originally it was intended that a main sewer was to run between the railway and the sea to conduct the sewage to the tank; but this scheme was deviated from, and a system of pumping adopted, with the result that one-third of the sewage has to be pumped twice, two-thirds of it pumped once, and only a very small proportion goes into the tank by gravitation." He does not say to whom the "blunders" referred to are attributable—whether to the terrible Drainage Board or to the engineers, and it seems almost inconceivable that a drainage system which originally allowed the sewage



to flow freely by gravitation to tanks should by any conjunction of blunders, howsoever "terrible," could possibly entail in lieu of gravitation a system of pumping twice one-third and two-thirds once. Mr. Wickham goes on to say:—"The system of pumping adopted was by power generated at the Town Hall by gas engines, and distributed to the pump at the People's Park, Toberna terrace, and Brighton Vale by water forced through high pressure mains, and it was found that the loss of energy was so great by reason of the pumps being so far away from the power-house that they could not work efficiently, and three years after the work was completed a more extraordinary revelation presented itself to the Board." He then adds that which certainly, on the face of it, appears more than astounding, for, says he, "we found that the largest pumping station (the one at Brighton Vale) was not wanted at all, and that the whole sewage of the township, excepting the low-lying levels of Booterstown, could be sent on to the tank by gravitation, and in order to effect this excellent scheme, it was only necessary to construct or continue the high level main from Seapoint avenue to Merriion avenue, and intercept the whole of Blackrock." To anyone unacquainted with the inner details and workings, it would seem at once that the obvious course was to construct at whatever cost, so long as it was at all within the range of practical affairs, this sewer, which would make gravitation. Moreover, in January, 1897, Mr. Chatterton, C.E., reported the system ineffectual, and recommended the high-level sewer. The late Mr. Strype, C.E., also recommended same. Mr. Kaye Parry also recommended the same work. In November, 1899, Mr. A. D. Price, C.E., reported the inefficiency of the pumping, and recommended the continuity of the high-level sewer, and furnished an estimate of the cost, which included—Sewer from Seapoint avenue to Merriion avenue, £7,000; sewer through Cross avenue to take high level of Booterstown, £600; sewer in Newtown avenue to intercept Blackrock sewers, £750; total, £8,350, which, if borrowed by the Blackrock Council, would entail a charge for sinking fund and interest of about £450 a year. Mr. Price in this same report tells the Board that the cost of pumping (which then stood at £800 a year) would be perceptibly diminished. But what is probably most astounding of all is the statement that, in spite of this apparent unanimity on the part of adversary engineers, Mr. Wickham says:—"The present Board are about to put down an electric plant to seek better results; but I am sure that those who advise this scheme do not bear in mind what the state of affairs was when the present machinery was at its best, when it was calculated by experts to be effectual, in normal weather, or, I should say, dry weather, the pump in the People's Park was able to pump the effluent, but that is a different thing to cleaning out the sewer." Further on he says "that where the flow in a sewer is small that all the solids are deposited in the bottom, and directly a storm or even a heavy shower comes on, and the sewer put under pressure, the whole of the solids are forced over the storm overflows on to the shore." Certainly, if gravitation be possible, and it is positively asserted that it is, then it becomes absolutely incomprehensible why this new scheme, described by Mr. Wickham as only patching up a bad scheme, should be suggested. Of course, on the other hand, it is not so obvious as Mr. Wickham asserts. Deposits would inevitably collect, because the normal flow is small, as it ought not to be beyond the possibilities of modern engineering science to devise some simple arrangement of automatic flushing at regular intervals, which would almost wholly obviate this danger.

In conclusion, Mr. Wickham points out that the adoption of the gravitation alternative, even with a large capital outlay, would be a saving to the rates.

We have no doubt the ratepayers of the district and others will await with interest some retort from the Drainage Board in contravention of Mr. Wickham's very serious allegations.



**Armagh.**—At the last meeting of the City Council there was read a letter from the Commissioners of Public Works stating that the Treasury had consented to the loan of £8,000 for the purpose of erecting houses under the Housing of the Working Classes Act on Banbrook Hill. The solicitor to the Council was instructed to take all necessary steps regarding the loan. Tenders have been invited for the clearing and laying out of the site, and the construction of roads, paths, sewers, manholes, and other works, according to the plans of Mr. F. Bergin, B.E., 36 Westmoreland-street, Dublin. Tenders will be received up to the 26th inst.

**Ballymacary.**—A new sacristy is to be erected in Ballymacary Church, Co. Westmeath, according to the designs of Mr. L. O'Callaghan, 22 South Frederick-street, Dublin.

**Belfast.**—We understand Mr. Basil Wilson, Malone-road, Belfast, is preparing plans for additions to the Co. Antrim Asylum.

**Ballygawley.**—Tenders are invited for the building of a wing, and for the execution of sundry improvements to the parochial house, Ballygawley, Co. Tyrone. Tenders are to be delivered not later than 20th September. Mr. J. V. Brennan, architect, Belfast.

**Ballymoney.**—The Technical School in Ballymoney has now been completed. The handsome brick building stands in its own grounds, and is admirably suited to the purposes for which it is intended. The architect was Mr. J. A. Hanna, Belfast, and the builder, Mr. Albert M'Master, Ballymoney. Messrs. Jameson and Son, Ballymoney, were the contractors for the plumbing and gasfitting.

**Cowran.**—Tenders are invited for work to be done to Gowran R.C. Chapel according to specification prepared by W. H. Byrne, Esq., architect. Tenders to be lodged with the Rev. W. Cassin, P.P., Gowran, Co. Kilkenny, on 22nd inst.

**Cushendall.**—The question of erecting a doctor's residence and dispensary, the cost of which is estimated at £750, has been adjourned for three months.

**Co. Clare.**—The Local Government Board have approved of the temporary appointment of Mr. Martin Tierney as assistant surveyor.

**Cork.**—Tenders are invited for the execution of sundry works at Sheares-street, Cork, for Mr. Patrick O'Connor. South Main-street, Cork, in accordance with plans and specification, which may be seen at the office of James F. M'Mullen, architect, 30 South Mall, Cork. Tenders close on the 22nd inst.

**Conna.**—Tenders will be received on the 25th inst. for the building of a teacher's residence at Conna.

**Carriock-on-Shannon.**—Board of Public Works will receive tenders for the erection of a new Crown Post Office at Carriock-on-Shannon, Co. Leitrim, on the 8th October, 1906.

**Coleraine.**—The Coleraine Courthouse Committee of the Londonderry County Council at its last meeting considered, as requested by the County Council, three plans for the repair and alteration of the Coleraine Courthouse. The scheme at first brought before the Council was that £2,886 was to be spent on the Courthouse buildings, but the County Council decided at last quarterly meeting that the sum was too high, and that the matter should be further considered by the Committee. The Committee were in favour of having the Courthouse properly repaired and altered. They did not consider this could be done under the price originally proposed, as it was most important that a council chamber and a retiring room for the Recorder should be provided. Mr. Barrie proposed that the Committee adopt the former plans, and Mr. Stevenson seconded. This was agreed to.

**Dublin.**—Messrs. Kapp and Peterson's premises in Grafton-street, opposite the Provost's House, are about to be re-built from the designs of Mr. Geo. P. Sheridan, A.R.I.B.A.

The Pembroke Urban District Council are erecting additional artisans' cottages at Donnybrook, Mr. E. J.

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Crampton, Hammersmith Works, being the contractor. Plans and specifications have been prepared by Mr. Edwin Bradbury, M.R.I.A.I., 36 South Frederick-street, Dublin.

The Pembroke Urban District Council require the services of a qualified overseer in connection with the work of the Council. Applications to be delivered on to-day, 22nd inst.

Tenders for the erection and completion of a gymnasium at the Royal Hibernian Military School, Phoenix Park, will be received by the Board of Public Works up to 9th October. The plans and specifications can be seen at Board of Works Office, Dublin.

Mr. D'Vine's new dancing pavilion in Bridge-street is now making satisfactory progress, and will shortly be opened. The work has been carried out by Alderman Doyle, 42 Portland-place, according to the plans of Mr. F. Bergin, B.E., 36 Westmoreland-street, Dublin.

The Corporation are about to erect workmen's dwellings in Townsend-street.

Mr. W. Beckett, Percy-place, Dublin, is engaged in erecting new premises and warehouses for Messrs. Hely and Co., Ltd., Dame-street, Dublin. The building is to be of ferro-concrete (Hennebique's system). Messrs. Batchelor and Hicks, 86 Merriam-square, Dublin, are the architects. Messrs. J. R. Thompson, of Fairview, Clontarf, are the sub-contractors for the ferro-concrete.

Mr. James Beckett, Ringsend-road, is building additions to Messrs. E. and J. Burke's bottle factory, at Ringsend.

Messrs. Alexander Hull and Co., Ringsend-road, have just completed a pair of cottages and drinking fountains, etc., at Ringsend for the Pembroke Urban District Council according to the plans and specifications of Mr. Edwin Bradbury, M.R.I.A.I., 36 South Frederick-street, Dublin.

In view of the International Exhibition next year the proprietors of the Shelbourne Hotel have instructed Messrs. Kaye-Parry and Ross, 63 Dawson-street, Dublin, to prepare plans for the addition and alteration of hotel premises.

Mr. Hanway, North-street and George's-street, Dublin, is engaged in re-building 22 Eustace-street, for the landlord. Mr. G. B. Sheridan, A.R.I.B.A., 25 Suffolk-street, is the architect.

Mr. Keely, Arran-quay, Dublin, is making additions to Messrs. Patterson and Co.'s match factory, Hammond-lane.

At the last meeting of the Corporation, Alderman Cotton moved the adoption of a report asking the Council to apply for a loan of £9,000 to complete the third and last section of the Bride's Alley Area Housing scheme. Mr. O'Carroll seconded the motion, and the report was adopted.

The Methodist Church at Clontarf is being rebuilt from designs prepared by Messrs. W. M. Mitchell and Sons, architects, 10 Stephen's Green, North. The contractors are Messrs. Collen Bros., of Portadown and Dublin.

Messrs. M'Carthy and Anderson, 39 Westmoreland-street, Dublin, have prepared plans for the erection of a new dispensary and residence at Irishtown for the South Dublin Union. Mr. James Mackey, 58 Dame-street, is the quantity surveyor.

Messrs. M'Loughlin and Harvey, Dartmouth-road, are the contractors for the new premises being erected in Wicklow-street for Messrs. Weir and Sons. Messrs. Batchelor and Hicks, 86 Merriam-square, S., Dublin, are the architects.

Additions to Pembroke House, Blackrock, the residence of Mr. Goodbody, consisting of a new wing, have been recently carried out by Messrs. M'Loughlin and Harvey, under the directions of Messrs. W. H. Mitchell and Son.

The new operating theatre and dispensaries at the rear of Mercer's Hospital, by the same architects, are now completed, and it is expected they will be formally opened early in October. Messrs. J. and W. Stewart carried out the contract, while the plumbing arrangements are by Mr. Howard M'Garvey, 62 Townsend-street.

Tenders are being invited by the Guardians of the North Dublin Union for alterations and additions to the dispensary house, Drumcondra.

**Enniskillen.**—The erection of a new Parochial Hall in Enniskillen is at present under consideration by the Select Vestry, but no practical steps have as yet been taken in the matter.

**Edenderry.**—The Board of Guardians will, on the 22nd inst., consider tenders for certain alterations and improvements at the Workhouse and Fever Hospital.

**Foxrock.**—A new church will shortly be commenced at Foxrock according to the plans and specifications of Messrs. Ashlin and Coleman, Dawson-street, Dublin.

**Fermoy.**—Tenders are invited for the erection of a new sergeants' mess, at Old Barracks, Fermoy. The drawings and specifications may be inspected, and the bills of quantities obtained at the Barrack Construction Office, Cork

Barracks. Tenders should be addressed to Director of Barrack Construction, War Office, Atterbury-street, Grosvenor-road, London, S.W.

**Galway.**—New schools are about to be erected at Eyecourt and Woodford, Co. Galway, for the Sisters of Mercy. Messrs. W. H. Byrne and Sons, 20 Suffolk-street, Dublin, are the architects.

**Greystones and Enniskerry.**—The Rathdown Rural District Council are about promoting a scheme of 48 labourers cottages for the Delgany, Greystones, and Enniskerry districts, Co. Wicklow. Messrs. Doolin, Butler, and Donnelly, of Dublin, are the architects. A prior scheme of 66 cottages will shortly be offered for tender. These include 21 in Dean's Grange, Blackrock, and a number in Dundrum and Glencullen.

**Kingstown.**—The ladies' bathing place at Sandycove is undergoing a re-modelling. New hot inside baths are to be constructed, and an open air bath, so as to be accessible for bathing at all tides. A rampart is at present being constructed across the front of the bathing place as a preliminary to starting the work, which has been entrusted to Mr. Weaver, Glashule. The work is being carried out by the Urban District Council, under the supervision of their engineer, Mr. Berry.

Mr. F. Weaver has also secured the contract for the building of Mr. M. C. O'Donnell's auction and furniture warehouses, Lower George's-street, Kingstown.

Mr. C. Squire, 12 Upper Abbey-street, Dublin, is building new premises for Messrs. R. J. Wilson and Co., confectioners and bakers, at Upper George's-street, Kingstown.

Mr. Pemberton, of Ballybrack, is building further handsome semi-detached villas at Rosemead Gardens, Kingstown.

The Grand Central Hotel, which is in course of construction facing the Royal Marine-road, will form an additional attraction in that rising district. It is being built for Mr. Hynes, a member of the Urban Council. The contractors are Messrs. Byrne and Son, Fairview, while the plans and specifications have been prepared by Mr. George Moore, M.Inst.C.E.I., 1 Foster-place, Dublin.

**Kinnegad.**—The foundation stone of the new Church of St. Mary, Kinnegad, has been laid. The building is designed in the Gothic style of architecture, and embraces nave, transepts, and sanctuary, with side chapels, and is built of local stone, with window and door dressings of limestone from the famous quarries of Tullamore. The main entrance to nave has a chiselled limestone porch, rich in detail, and having above, lighting the gallery, two traceried two-light windows, with cusped gable, trefoil, and side pinnacles, forming a very beautiful front elevation. A splendid feature in the design is the broad octagonal chancel, with chapels on either side, and divided by arcading with richly worked arches and columns of Irish granite from the now well-known Galway quarries. Columns in this same granite are introduced into the doorways. The plinths and bases to the columns are of Irish granite from Crowreagh quarries, near Newry. The nave has a very elaborate open timber roof, the wrought and moulded principals of which are supported on elaborately carved corbels, and appear between each window. These windows of nave are two-light, point-headed with hoodmolds and carved terminals. The transepts have similarly treated open-timbered roofs, and three-light traceried windows in the gables, and ornamental quatrefoil lights in the side walls. The church is 128 feet long, and the nave is 34 feet wide, with double transepts 32 feet wide, and a very extensive sanctuary and chapels. The building was designed by Mr. F. F. McNamara, Dublin, and the work is being carried out by Mr. James Wynne, Dundalk. The walls are already built to a height of about 12 feet.

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# ENGINEERING SECTION.

## ITEMS.

According to a report just issued, the amount of water used in 1905 for washing the streets and courts of the City of London was 61,953,459½ gallons. Such accuracy is calculated to provoke a smile.

The people of these islands may be slow as compared with their Western trans-Atlantic kinsmen, and may be subject to more grandmotherly legislation; but figures of injury from steam-plant accidents show that haste has its grave disadvantages, and freedom from careful inspection exacts a terrible toll. From June 30th, 1904, to June 30th, 1905, British steam-plant accidents accounted for 14 persons killed and 40 injured; whereas in the United States, with only 50 per cent. more boilers, 383 persons were killed and 585 injured during the same period. The difference between these figures tells its own tale, and the proportion of killed to injured across the water seems to indicate that when a boiler does explode it does so in a very thorough and convincing manner.

The Engineering and Machinery Exhibition at Olympia, which will remain open from September 15 to October 15 will be well worth a visit from those interested in such subjects. The exhibition has received the support of both home and foreign manufacturers, and the huge hall has every available foot of its area occupied. Sir Alexander Binnie, President of the Institution of Civil Engineers, performed the opening ceremony, the keystone of the preparations which have been proceeding for many weeks past. Whilst this exhibition will not have the mysterious attraction for the man in the street which the Electrical Exhibition held for him last year, the show will appeal to all classes of engineers and students, and that ever-growing class which intellectually concerns itself with modern invention.

In Montreal each year, during the hot season, the problem of water waste and its prevention causes concern to the Water Department. The figures of the daily consumption are startling, and indicate very serious defects in the service. Sixteen years ago, when the population of Montreal was 216,300 the average daily consumption per capita was 66.1 gallons, a generous allowance measured by modern requirements. But to-day, with a population of close on 300,000, the consumption is 102.78, or over three times the quantity acknowledged by leading authorities to be sufficient. Six inspectors are employed, but under existing circumstances their services are of little avail. The Assistant-Superintendent opines that the only way to check the waste effectually is to first thoroughly overhaul and repair the water-mains, and secondly, to instal the meter system in the houses. The public, however, objects to the latter, because the profits which the management of the supply shows each year are not devoted to the reduction of the water rates, as is held to be the proper disposal of such profits. With a daily waste of at least eleven millions of gallons of water, known and acknowledged, the management will entail a very heavy responsibility should a water famine result.

The statistics just published with regard to tramway accidents are extremely interesting, when the recent increase of electric traction is taken into consideration. The proportion of accidents, including the most trivial, is one to every 15,000 passengers. The following is an analysis of the accidents on some of the larger systems:—Collisions with horses, vehicles, and cyclists, 50.2 per cent.; falls on entering or leaving cars, 27.3 per cent.; knocked down by

passing vehicles while entering or leaving cars, 3.1 per cent.; breakdown of vehicles on track, 6.1 per cent.; accidents to employees, 2.4 per cent.; knocked down by cars, 1.1 per cent.; collisions between tramway cars, 0.8 per cent.; electric shocks, 0.1 per cent.; miscellaneous, 8.9 per cent. It will be seen, as might be expected, that slightly over one-half the accidents occurred in collision with other traffic, for which contributory causes may be assigned. In the second and third divisions the tram officials can scarcely be considered in any degree to blame. The actual number of major and minor accidents for which sole responsibility could, in equity, be attributed to the companies is only 19.4 per cent., or roughly one in every 75,000 persons carried. With regard to fatal accidents, on a large and intricate system like that of Liverpool, the ratio for a period of five years is only one to about 18,000,000 passengers carried. These figures indicate that, in spite of the enormous extension of electric tram services, and the increased size and speed of the vehicles over the old horse-drawn vehicles, the utmost precautions are taken to safeguard the public, and that the results of such precautions are satisfactory.

As a result of the rather bitter discussion on the condition of the Cork water supply, the acerbity of which was increased by the paper read by Major Jackson at the Congress of Public Health, and the threat of the officer commanding in Cork to withdraw the troops, samples of the water were submitted to Professor MacWeeney, M.A., M.D., for analysis and report. He states as a result of his investigations that the unfiltered river water is a favourable sample of its kind. The presence of coli is not to be wondered at in an open river, flowing through more or less inhabited districts, and bordered in places by cultivated land. He further expresses surprise that, considering the abnormally high temperature, there were not *ten times as many coli germs in this water*. The water from the pure water basin also yields most satisfactory results. It is clearer and contains fewer germs. Coli has disappeared out of one of the two samples, whilst in the other it still persists, but in numbers that are ten-fold fewer than in the unfiltered water, and are devoid of hygienic significance. The sediment, moreover, consisting as it does of *small fragments of rotten wood*, is quite devoid of importance. Lastly, the pipe water is equally satisfactory, showing a marked improvement on that from the pure water basin. The germs have undergone still further diminution, and are well within the limit permissible in the best town water. Professor MacWeeney appended an analytical table, and concluded his report by congratulating the Corporation on the present condition of their public water supply as shown by the analysis of these samples, taken at the hottest time of the year.

The report was considered by the chairman and one other member of the Public Health Committee, the Town Clerk being also present. The report naturally afforded much satisfaction, and the meeting terminated in a spirit suitable to a mutual admiration society. But there is still a very stiff fence to be surmounted, and that is the analytical report of the military expert, which is in direct opposition to that under review. It will be interesting to note how a *modus vivendi* will be arrived at. Meanwhile, the ordinary mind may well wonder how samples from the same water supply affords the utmost satisfaction and cause of congratulation to one analyst, whilst another can scarcely find sufficient words of condemnation. Are chemical expert witnesses going to fall into line with those of the other professions, whose diametrically opposed views about the same matter afford so many opportunities for legal witticism from the Bench and the Bar?



During the next few years there is little doubt that the serious question of the nationalisation of railways will be frequently before the public, and the forthcoming Railway Commission will give it considerable impetus with regard to Ireland. Attention is also being directed towards the State purchase of British railways, but this is not nearly so practical an issue at present as that in our own country. There are three obvious and serious objections to the major proposals. The first is the vast financial operation involved. It has been estimated that a sum of over a thousand millions would have to be paid by the Government to buy up the present vested interests, plant, and rolling-stock. This would necessitate the issue of another stock, nearly twice the size of Consols, and would assuredly weaken the premier security, which at present, for many reasons, is far below normal. The second reason is the undesirability of enrolling the railway men as servants of the State, and forming a body of civil servants over half a million in number, whose voting power would be enormous, and if used for their own ends might not always be for the advantage of the public or the country. The third objection is the elimination of competition, which undoubtedly helps to lower rates and to raise the standard of comfort provided by the companies for the public. Such rates may occasionally be extortionate when the companies, with their dividend-earning propensities, have not fully realised altered conditions. Comfort may not, for the same reason, always be up to the expectation of the individual. But in time these anomalies right themselves, under stress of rivalry and public opinion. A State-governed railway may, under political pressure, cut down rates, but losses have to be met somewhere, and the savings that may be effected by the co-ordination of the present various staffs would probably be more than counter-balanced by the expenditure necessitated by the creation of a huge body of civil servants of different grades. At present the State has the use of the railways for national purposes, such as carriage of mails, troops, etc., on terms practically dictated by the Government. At the same time there is no risk to the national exchequer. The public is amply safeguarded by the Board of Trade, and the railway companies are kept to strictly defined lines as to the precautions to be taken against accident. It is easy to imagine that a different state of affairs will bring the millennium, but the examples of State-managed railways elsewhere do not afford material ground for such anticipations in this case.

In the Presidential address before the Congress of the Incorporated Sanitary Association of Scotland at Leith, Mr. John Bryce, Assoc.M.Inst.C.E., the Borough Surveyor of Partick, dealt broadly with some sanitary problems incident to populous centres. Engineering science, as Mr. Bryce informed his audience, covers a much larger field, and has a far greater meaning than it had twenty or thirty years ago. The improvement of cities, construction of water schemes, drainage schemes, and works of sewage purification, the erection of pumping stations, destructor works, electric lighting and power stations, and the specialisation of the heating and ventilation of public buildings and hospitals, have all combined to emphasise the value of the engineer in the sanitary crusade, and the necessity of utilising his services and experience for the public well-being. After dealing with the question of free open space around habitable houses, in which he stated the truism that Acts of Parliament, instead of being of a high standard, and designed to promote the health and comfort of communities, often represent the low water mark of reform, Mr. Bryce expressed his views upon the present position of the problems of water supply and sewage disposal. His remarks on refuse disposal were, however, perhaps the most interesting of the whole paper. This is a matter which is happily being seriously faced by every enterprising centre. Authorities realise now more than ever that whatever may be the cost, they must have all objectionable refuse disposed of in an efficient manner, and with an absence of nuisance to the neighbourhood. The method of tipping into old wastes,

quarry-holes, hollows, and on the seashore can only be a temporary expedient. Available sites are gradually being exhausted, while the dangers attached to the removal and spreading of the refuse, as well as the cost of transport, make the system inefficient and insanitary. It is now accepted by all progressive sanitarians that the most effectual method of disposal is by cremation in a well-designed, modern destructor. There are certain elements in connection with this question which are attractive to municipalities, viz., the utilisation of waste heat, waste products, and the economic results therefrom. The President warned the Congress against the wild and fanciful ideas as to the possibilities of this great power, of which some of even the great scientific leaders are guilty; but through the course of a few years' experience we have been reduced to hard facts and common sense. The varying calorific value of refuse as a steam fuel at different periods of the year has shown the necessity for caution in relying on it as a permanent source of supply; but while this caution has to be exercised, and all allowances made for this variation, we are brought back to the satisfactory fact that a refuse destructor is a most valuable asset as an aid to an electric lighting or power station. The primary use of a destructor is, of course, the effectual cremation of refuse, and if that is accomplished, it has served its main purpose well. But it is a very fascinating result to find, as at Partick, that a substantial sum can, at the end of each year, be placed to the credit of the destructor's account for steam raised and utilised during the year's working, and if this sum were put in figures of fuel supply for the electric lighting department, it would probably represent between 2,000 and 3,000 tons of coal. Mr. Bryce concluded his address with some suggestions as to the dust nuisance, and he does not apparently attach much weight to the various patents for sprinkling on the surface. New roads for new conditions is his idea of solving the problem, the Government to assist by increased grants to local authorities towards meeting the additional maintenance required, and by granting additional powers to enable local authorities to borrow money to meet capital expenditure on re-paving the existing roads with some form of dustless paving. But which?

### THE ARKLOW HARBOUR.

Mr. R. G. Allanson-Winn, M.I.C.E.I., the recently appointed engineer to the Arklow Harbour Commissioners, is engaged in making necessary borings before the plans can be prepared and submitted for Government approval. The extension of the south breakwater of the harbour has been under consideration for some years, and though the Government grant is somewhat small, it is hoped that the expenditure of the £14,000 available will lead to a considerable improvement, and prevent the shoaling of the harbour mouth for many years to come. Most harbours on the east coast of Ireland are often practically useless as harbours on account of their efficient action as traps for the sand, which is deposited near their entrances in form of bars, which necessitates the constant use of dredgers.

Mr. Winn has recently completed a system of chain cable groynes for the protection of the sea walls at Barnageeragh, a small place between Skerries and Balbriggan. Five of these groynes, over 1,700 feet in the aggregate length, have been placed on the shore, and it is to be expected that they will materially assist the deposit of sand, and add to the stability of the shore surface.

The remarkable points about this system, which was fully described in papers read to the Society of Engineers on March 5th, 1906, and to the Engineering and Scientific Association of Ireland on May 28th, 1906, are its simplicity and economy. The groynes cost about 2s. per foot run, and can be maintained by unskilled labour at a very small annual outlay. The work alluded to has been carried out for the Dublin County Council.

**Raphoe.**—Tenders are invited by the Rev. S. Meek, M.A., Raphoe, up to the 22nd inst., for building and completing new manse for the committee of No. 1 Presbyterian Church. Plans and specifications to be seen with the Rev. S. Meek, M.A., or at the office of architect, Mr. John McIntyre, Letterkenny.

## STEEL PIPES ON BELFAST WATERWORKS.

(Special to the "Irish Builder and Engineer.")

Until recent years no British engineer had ventured to employ water pipes of other materials than cast iron. In fact, our professional brethren in the United States have given us a lead in this as in many other matters connected with engineering.

In using cast-iron, as everyone is aware, there is always an element of uncertainty, and though improvements in the mixtures of pig iron and in manufacture have somewhat reduced the risk of subsequent failure, still the risk remains. Internal pressure in a pipe sets up a tensile stress in the material of the pipe, and cast-iron is not at its best when subjected to tension. Hydraulic mining and quarrying, when introduced into the western mineral fields in the United States, involved the use and supply of large quantities of water, and conduits had to be carried over long distances, and when the contours of the country were favourable the problem was very simple, and open channels were constructed. In many cases, however, pipes working under heavy pressure had to be employed, and when the diameters were small, cast-iron and flumes of timber for larger dips were laid down. But for the larger sizes of metal pipes the question of transport had to be taken into account, and then there was the risk of fracture to which large cast-iron pipes are exposed in transit. Wrought-iron plates with riveted joints were then introduced, and pipes up to 5 ft. diameter were made with this material. But mild steel with riveted cross joints and welded seams has now been adopted, and the results have been, so far, satisfactory.

The principal objections to the use of mild steel plates for water-pipe purposes are the expense and the liability to corrosion. But the former is not so serious after all, for improvements in processes have cheapened mild steel, and, further, it must be borne in mind that in a pipe of, say, 3 feet diameter, mild steel  $\frac{3}{8}$ ths of an inch thick is equal in tensile strength to cast-iron of a thickness of  $\frac{1}{2}$  inches. Hence, mild steel at £18 per ton would be cheaper than cast-iron at a price of £5 per ton.

Passing on, however, there are some 15 miles of piping on the line of conduit which conveys the new Mourne water into Belfast, and of these about  $\frac{3}{4}$  miles are subject to pressures varying from 250 to 400 feet of head. Eventually three lines of pipings will be required when the Mourne scheme is fully developed, but, meantime, a single line has been laid down, and this is capable of conveying about 12½ millions of gallons of water in each twenty-four hours.

After full consideration, the Water Committee determined to adopt mild steel for all pipes subject to a pressure of 250 feet and upwards. The thickness of plate adopted was  $\frac{1}{2}$ -inch, which was greater than necessary to resist bursting tension, but it was thought well to allow something as against corrosion, a matter which will be referred to further on.

The specification for the steel plates included the following:—Plates to be prepared according to the Siemens-Martin process. Samples for testing taken while material in fusion. Chemical analysis made and supplied from time to time, carbon not to exceed .18 per cent., phosphorus, .040 per cent.; sulphur, .040 per cent.; manganese, .4 per cent. When the tests showed that the right quality had been attained, the steel to be tapped off into ingot moulds, and afterwards rolled into plates. Test pieces were cut off the plates, afterwards planed true, and made 2 inches in width, of a clear testing length of eight inches.

All test pieces to stand a tensile stress of 24 tons, but not more than 27 tons per square inch of original area, elongation not less than 20 per cent. on the length of 8 inches, and the contraction of fractured area equal to 45 per cent.

There were also cooling and bending tests of an elaborate character, and a final provision was that the steel was to weigh 490 lbs. per cubic foot.

The plates required for the Belfast pipes were made in Middlesboro', and when fully tested were conveyed to Birmingham, where they were formed into pipes. Each plate had a nett length of 8 feet, and such a width as when bent to the circular form made a pipe 3 feet internal

diameter. Bending to the circular form was done in a three-roll mill, the plates being cold. Welding was adopted for making the longitudinal joints, and this was carried out in an ingenious manner as follows:—The length of pipe to be welded was carried upon a beam with curved top, which gave a solid bearing to the edges of the joint. A small travelling steam hammer was then made to move backwards and forwards along the pipe, striking very rapid blows as it worked its way to and fro. Attached to the carriers of the hammer were two very powerful jets of incandescent water-gas, which played upon the edges of the joint close in front of the hammer. By this means the edges of the plate were kept at a white heat until the weld was completed. At this stage the 8 feet length of pipe was slightly heated in an oven, and carefully trued up to the circular form. Next the eight feet lengths were connected together by means of thimbles 15 inches long and of  $\frac{1}{2}$ -inch plate, shrunk on, and then riveted through both thimble and the plate of the pipe. The standard length of pipe was 24 feet, made up of three lengths of 8 feet and two thimbles.

Riveting was done by a hydraulic arm, flat heads being formed inside the pipe to make the angles as few as possible.

When fettled and cleaned, each 24 feet length of pipe was tested in a hydraulic machine to a head of 1,000 feet of water, and well hammered during the operation. After annealing, the coating of the pipes was the next operation, and this was done in two stages. First, the pipes were dipped in a bath of Smith's blackwash of 450 degrees Fahrenheit, and allowed to get thoroughly heated, and, on being taken out, they were hung upon a crane and allowed to drip. This treatment was to all intents the same as that usually adopted in the case of cast-iron pipes.

When the black varnish was thoroughly hard, the pipes received a second dip in a bath made up of Trinidad Asphaltum, mixed with some quick drying oil, coal tar, and fine chalk, and when taken out they were allowed to drip as before.

An interesting question here arises, and it relates to the permanency of the coating—will it last? Engineers have very little experience on this point. With cast-iron pipes, however, it is different, for pipes of the latter material have been found after 30 years' use to have their Angus Smith's coating in perfectly good order, and free from rust and nodules.

But then the grain of mild steel is not so coarse as that of cast-iron, and there is no doubt the Angus Smith's coating penetrates deeper into the cast metal than into the steel. As regards the second coating, it is somewhat uncertain how long the asphaltum will adhere to the pipe. Time alone can throw light on this part of the case, but it was found that when a pipe had been left exposed to the rays of a very warm sun the asphaltum blistered, and in some cases ran into welts.

This softened part of the coating had to be removed by means of wire mops, and a hot brush coat of fresh asphaltum then applied. In total weight each 24 ft. length of 36 inch pipe ready for laying averaged 2 ton 7 cwt. 0 qrs. 6 lbs.

A cast-iron pipe, 4 yards nett length, to stand a pressure of 400 feet, would weigh three tons. So that in a matter of mere weight the steel pipe was much easier to handle.

But, after all, the freedom from risk of fracture was perhaps the most important element in the case.

Handling a heavy cast-iron pipe is bad enough, but the liability to fracture is a source of constant anxiety. After safe carriage to the side of the track a slight jar cracks the pipe, and when the crack is found out only after the pipe has been laid, the matter is worse; cutting out and placing in a new length has to be resorted to, with great expense and very serious delay to the work in general. With pipes of mild steel, however, there is no dread of fracture; a pipe may be bumped down from a waggon on to a hard road without risk of damage, and after being laid in position there is no danger of a burst.

For joining the pipes, collars were used, and melted lead caulked up in the usual way. The plates for collars were



rolled to necessary section, and after being cut in lengths were welded into hoops. The portion of socket intended for lead was divided by a fillet, so that the lead on each side was caulked against a solid bearing. Out of the total length of  $\frac{3}{4}$  miles of pipes only two collars failed, and these had to be cut out and replaced.

Before jointing, it was found necessary to completely remove the asphaltum from the ends of pipes and insides of collars, as the coating prevented the lead from being driven home hard against the steel.

Every quarter of a mile manholes with lids bolted on were provided, so that inspection and periodic cleaning can be carried out when found necessary, and in one deep cutting, where the pressure of the filling was heavy, a double line of pipes was laid, and the material was made  $\frac{5}{8}$ ths of an inch in thickness. This portion of the works required only a double line of pipes for the full development of the scheme, and in the future this deep cutting will not, in all probability, have to be opened again.

As to the element of cost, the steel pipes were delivered at points about 35 miles from Belfast at £16 10s. per ton, and the cast-iron pipes came to about £4 12s. per ton; and taking cast-iron as requiring a thickness of  $\frac{1}{4}$  inches as compared with  $\frac{3}{8}$ -inch for steel, the relative cost would be £5 10s. for steel and £4 12s. for cast-iron.

Here the question at once arises: Is it worth while to use steel, entailing as it does this additional expense? But the freedom from bursts, with all the worry and expense they bring in their train, would appear to be well worth the additional cost in the case of steel pipes of large diameter.

With respect to the possibility of early corrosion, nothing very definite can be said. Experience only can throw light on this point.

The Newcastle section of the Mourne conduit, with a length of about 11 miles, including two miles of tunnelling, was carried out by Messrs. H. and J. Martin. Their contract price was £96,000, and the steel and cast-iron pipes were supplied to them by the Commissioners.

Messrs. Piggott and Co., of Springhill, Birmingham, provided the steel work, and Messrs. D. Y. Stewart, of Glasgow, furnished the cast-iron pipes. For the whole 11 miles the cost reached the figure of £146,468.

This and the other sections of the Mourne scheme were carried out under the supervision of Mr. L. Livingston Macassey as engineer.

### SEWAGE TREATMENT.

#### The Birch-Killon Fiddian Distributor.

In further reference to our article in last issue on the subject of the Fiddian Distributor for sewage filter beds, we may now add that this system has been in use most successfully near Birmingham for dealing with the whole of the sewage of the Hollymoor Asylum, recently constructed by the City Corporation of Birmingham. The sewage works were carried out by Mr. J. D. Watson, M.I.C.E., chief engineer to the Birmingham, Tame and Rea Main Drainage Board, and he speaks very highly of the work.

The installation at Enfield is only just completed.

The Fiddian Distributor will deal with any quantity of sewage, however large or small, which is required to be put on the filters, because it has a clear and large waterway throughout. The fact that it will deal with small quantities is, of course, the more important, because dosing tanks and the necessity for rapid discharge on to the filters are avoided.

It consists of an elongated water-wheel, which not only revolves on its horizontal axis, but also carries itself over the surface of a filter on roller tracks. It is connected by a pipe to a supply of sewage or tank effluent. The sewage falls into the buckets of the wheel, spreads itself along the bucket, and its weight, causing rotation of the wheel, it is immediately discharged in a thin film and spray over the whole surface of the filter.

The filter may be either circular or rectangular, but the circular form has important advantages over the other in respect of simplicity of working. In the former the motion is continuous so long as there is an ordinary flow of sewage,

whilst even the smallest flow must fall into the buckets, produce intermittent rotation, and be distributed. It is also a powerful wind engine when constructed with two balancing arms, because the wind enters the buckets of each arm, and tends to rotate them on their horizontal axes.

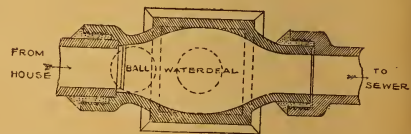
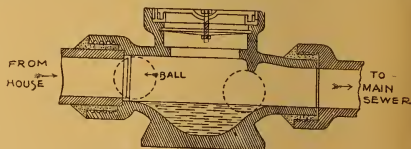
The Fiddian Distributor is in successful use in many parts of England and Scotland, and has been largely adopted by the Government engineers of India and South Africa. It is of great service not only for large installations, but for country houses, because there is no chance of its failing in action, and there are no small holes, which in other distributors require very frequent attention.

Any of our readers desiring further particulars of this very up-to-date aid to sewage filtration would do well to communicate with Messrs. Birch, Killon and Co., 20 Cooper Street, Manchester, who will be glad to forward illustrations and details of their patent.

The illustration we published in our last issue conveys a good idea of the working in connection with a circular filter.

#### JOHNSON'S PATENT BALL TRAP.

We have just received particulars of a new patent ball trap, designed and recently patented by a young Dublin architect, Mr. Francis Johnson. The object of the trap is to prevent the back flow of sewage or rain-water through the drain from the main sewer into the house, and the ingenious method by which this is effected will be readily comprehended from the accompanying illustrations, which explain themselves. The system is automatic, the ball falling back into the centre when the sewerage recedes, and allowing of the usual flow from the house. The trap is also applicable to boiler-houses and similar places, and as regards house drainage, it should prove especially valuable in houses situated in low-lying districts, where



great inconvenience and danger to health are often experienced in times of flood. There would seem to us to be a fine opening for this article. It is well designed, and up to the present there has only been one similar trap to be had, and Mr. Johnson's invention possesses the merit of being only about half the cost. When we mention that the trap is made by the Bourtreehill Fire Clay Company, our readers may be certain that the quality is all right. The cover is hermetically sealed, but is so designed that it can easily be removed for inspection. Raising pieces can also be fixed. The trap is made in all sizes in extra yellow glazed ware, and is sold by Messrs. John M'Ferran and Co., of Tara Street, Dublin.

Owing to the increase in volume of the London trade, Carter and Co. announce that they have been compelled to remove their London Office from 43 Essex-street, Strand, W.C., to 29 Albert Embankment, S.E., where they have more commodious premises, enabling them to keep a good stock of all descriptions of tiles, etc., and where there are ample facilities for showing their various designs and samples of glazed fireplaces, dadoes, floors, etc.

ANSWERS TO CORRESPONDENTS.

**Iron Stains in Granite.**

**P.T. (Dublin)** asks how can iron stains be removed from granite.

[Perhaps some of our readers who have had experience of this very troublesome matter can help our correspondent.]

**Sewer or Drain?—A Peculiar Case.**

**A.F.** has a peculiar case of "sewer or drain," about which he asks our advice. "A" held certain premises drained by a conduit going out through the rear. Subsequently "A" sold the entire place in fee simple to "B," but subject to the condition that "B" leased him back the front part, or about the half of the whole. He also told "B" of the existence of this drain, and suggested that "B" could also make use of it. The whole plot, therefore, became invested in fee in "B," who made the required lease of half to "A," the original owner; built a house on the remainder and connected with the existing drain. The sanitary authority becoming aware of this called upon "B" to put in a separate system. "B" contends that as owner in fee of the whole he became possessed of the drain in its entirety, but before the existence of the drain was known "B's" architect had deposited a plan showing an independent system with the authorities. This they seek to hold him to. "B's" architect now asks our advice; having already connected with the existing drain or sewer he is unwilling to rip it all out again, and lay a new drain. On submitting the case to a legal authority, we have received the following advice:—

I have looked into the case you sent me. On the whole, my opinion is against "B," for the following reasons:—

(1) As far as disclosed in your letter the premises now held by "A" and "B" seem very recently to have been *entirely* in the possession of "A." I judge from your diagram that "A" and "B's" premises formed one premises, which had a frontage to two streets. If this surmise is correct, and if at the time "A" laid down the then new drain, the premises (now divided) were one house in the occupation of one person, the mere fact that they were subsequently divided, would not alter the nature of drain, neither would the fact that the sanitary authority approved of the drain for the premises when the entire was vested in one person and used as one building estop them from insisting on a new drain when the premises were divided. *A fortiori*, if "B's" portion was so far demolished as to make the building he was erecting a "new building" under the Public Health Act (1878), sec. 43.

(2) Next, I think the fact that the plans submitted by "B" for the approval of the authorities showed an independent drain would be sufficient reason for them to refuse their sanction to any altered scheme.

(3) As to the principle, "once a drain always a drain," that rule only comes into operation when the drains were, *de facto*, sewers at some time or another. This does not appear ever to have been the case with the drain in dispute.

(4) As to your correspondent's power to turn the drain into a sewer, the Corporation notwithstanding—the law will not permit a man to profit by his own unlawful act. If, however, the premises were (*before*) they became vested in your correspondent) two separate premises occupied by different persons, but belonging to the same owner, and if, *while in that condition*, the then owner wrongfully and without informing the sanitary authority connected them, such connection, although unavailing to the person who did it, would make them sewers in the hands of his assignees, presuming, of course, that they were innocent parties. See *Kershaw v. Taylor* (1895), 2 Q.B., 208, 471, and *Reg. v. Vestry of St. Matthew, Bethnal Green* (1896), 2 Q.B., 95, 319.

Messrs. W. H. Byrne and Son, 20 Suffolk-street, Dublin, have lately prepared plans and specifications for the under-mentioned work:—The building of the new Church of St. Agatha, North William-street; Mr. James Kiernan, Talbot-street, contractor. The new schools in connection with George's Hill Convent; Mr. Kevin Toole, Upper Dorset-street, contractor. New Preparatory Schools at Carysfort Park, Blackrock; Mr. Griffin, Blackrock, contractor. They have also prepared the plans for the large additions at St. Kieran's College, Kilkenny, Messrs. John Ryan and Sons, Limerick, being the contractors.

ENGLISH ARCHITECTURE.

English architecture certainly needs to be "steadied," if we look at the manifold vagaries of style which one sees about in the streets, and even in the designs which have undergone a certain amount of selection for the annual Royal Academy Exhibition. But it is rather strange to find the example or tradition of the Renaissance, half a century ago supposed to have been the curse of English architecture, now suggested as furnishing the saving element of tradition as the guide for our future course. Is there anything in this, or is it only another delusive hope? An able and original contemporary mind has proposed exactly the contrary course; the deliberate hunting down of school detail—columns, pilasters, cornices, and mouldings—and beginning afresh on the bare materials of construction, to see what we can make of them for our own purposes. That sounds attractive as a ground for new developments; the drawback is that it is impossible. The human mind cannot shut itself out from precedent, nor can it be long content with bare walls and roof—if reforming architects were content, their clients would not be; and when we began again endeavouring to give architectural expression to these bare walls, we should find ourselves almost unavoidably falling back on something very like the old discarded forms of detail, the difference perhaps being only in inferiority and not in improvement. And, as Mr. Jackson pointed out in his Royal Academy lectures, the mere fact that buildings for the same general purpose, in civilised societies, require the same nature and arrangement of interiors, inevitably stamps upon architecture a certain conservatism. And as for the direct endeavour at originality in detail, we have seen too much of what that may lead to in the disease called *art nouveau*. The remark that the Classic tradition was "the last effective influence in England," though it came to an end one hundred years ago, puts one on thinking whether, after all, the classical tradition is not the most permanent element in civilised architecture. Column and entablature have played a larger part, have been a more persistent element in architecture, than any other principle of structure and expression; even in Gothic architecture the column and capital, or shaft and capital, are directly derived from the Classic column. Gothic architecture was a development out of Roman; after it had passed through all its development, the minds of educated men seem to have had a disposition to recur to the Classic order again as a more cultured form of architectural expression. Its world history is far longer than that of Gothic, and it is almost a question whether the Classic column and capital, at all events, have not become in truth part and parcel of architecture itself. And the adoption of the Classic tradition, while thus bringing us back to what has proved the most permanent element in architectural style, does not preclude novelty and originality of treatment, as the example of the Italian and French Renaissance architects, as well as of Wren and the best men of his school (such as Hawksmoor and Archer), very clearly shows. These men were not mere copyists; they worked out their own architectural conceptions with materials borrowed from Classic architecture; and of this cult they certainly did not exhaust the possibilities. There is room, therefore, for further development on the basis of this oldest and most widely-extended tradition of architecture, the maintenance of which may prove itself the steadying influence which English architecture requires to restrain it from wandering into aimless vagaries. It has proved such an influence in France. Whatever criticism may be passed on the too Academical tendencies of the *Ecole des Beaux-Arts* system of education, the fact remains that the French have a school of architecture and we have not—"The Builder."

**FOR SALE**—Single Vertical Spindle Molder, 24-inch table, by Elsworth. Complete with straight fence and safety guard, ring fence for circular work, rising and falling head; countershaft and reverse slotted rings; quantity irons, etc.; £10.—229, this Office.



## ENGINEERING NEWS.

**Bangor.**—In the advertisement of the Urban District Council, asking for tenders for the construction of a reservoir and auxiliary works at Ballysallagh Major, and also for the laying of a line of pipes for the intended reservoir to Bangor Urban District boundary, we regret that a typographical error appeared in our last issue, the size of the pipes specified being 12 inches, not two inches as printed. Plans for the intended works have been prepared by Messrs. L. L. Macassey and Sons, 7 Chichester-street, Belfast, and can be seen at their office. Tenders close on the 2nd prox.

**Ballybay.**—The Council of Ballybay Rural District received tenders for opening up and building of banks of ancient watercourse, laying of iron and earthenware pipes, and building gulleys, in the townlands of Carnaveigh, Carrickate, and Carrickavelly, in all about 480 perches, in accordance with the plans and specifications prepared by the Council's engineers, Messrs. Francis Bergin, B.E., C.E., Dublin, and James Keelaghan, C.E., Ballybay.

**Carlow.**—Mr. J. D. Feehan, Ballinacroy, has been appointed an assistant county surveyor by the County Council.

**Dublin.**—The Blackrock and Kingstown Main Drainage Board invite tenders for the supply and erection of electric installation for the transmission of power at Blackrock, Co. Dublin.

The Corporation invite tenders for the supply and erection of two boilers, locomotive type, with necessary steam and water supply pipes at the East Road pumping station.

The Pembroke Urban District Council are prepared to receive applications for position of draftsman and assistant to the borough surveyor, and to assist the surveyor generally in office work, also in preparing plans and estimates and taking out quantities, plotting surveys and sections form field works. The applicant must satisfy the Council that he has had sufficient experience in making main surveys and levelling, etc. Application, in own handwriting on form to be obtained, together with copy of testimonial from last employer, to be sent in so as to be received before noon on Saturday, 20th inst. The princely "wages" of 30s. per week are offered! Lest the Councillors might be too vigorously importuned, it is added that personal canvassing disqualifies.

**Londonderry.**—The Committee of Management of Londonderry District Lunatic Asylum have received tenders for supplying and fitting up two Cornish boilers, each 12 feet long, and five feet diameter, at the Asylum in Derry, and one large vertical tube boiler at Gransha Asylum, in accordance with specification prepared by Mr. M. A. Robinson, C.E., Richmond-street, Londonderry.

**Midleton.**—The Urban District Council will, on the 26th inst., consider applications for the position of clerk of works over certain extensions and improvements to the Midleton Waterworks. The salary will be at the rate of £2 a week, and the person appointed will be required to devote his whole time to the work.

**Mountmellick.**—The District Council invite tenders for extending the 3-inch water main from the present Pillar in Parnell-row, to the end of Metcalfe-terrace, Maryborough, with all necessary fittings. Tenders will be considered on 22nd inst.

**New Ross.**—The preliminaries for carrying out the waterworks are almost complete, and it is hoped tenders will shortly be advertised for. The work consists of constructing storage reservoirs, filters, etc., and the laying of seven miles of cast-iron mains, also an extensive system of distributor mains in the town. The cost of the work is estimated at £11,000, and plans and specifications are being prepared by Mr. F. Bergin, B.E., 36 Westmoreland-street, Dublin.

Messrs. Wm. Coates and Sons, Ltd., 5 Leinster-street, Dublin, have obtained the contract for the electric lighting of the Science and Art Buildings, Kildare-street, Dublin, which includes the Natural History Section, Art Museum, School of Art, Leinster House, and National Library. The work will be carried out under the supervision of Mr. R. N. Eaton, resident engineer.

Messrs. Wm. Coates and Sons, Limited, have also been entrusted with the electric lighting of the Royal Irish Academy, according to the plans and specifications of Mr. J. Howard Pentland, surveyor to the Board of Works. The work will be carried out on the simplex screwed conduit system, and there will be over 200 lights.

**Tullamore.**—The County Council are substituting a new cast-iron sectional boiler in place of the old one at the Courthouse, and are repairing the iron work of the furnace chamber connected with the Crown Court.

**Tralee.**—Mr. T. Delahunty, Dublin, was unanimously appointed town surveyor at the last meeting of the Urban Council. The salary attached to the post is £200 per annum. Mr. Delahunty has recently been engaged as assistant to the surveyor of the Pembroke Urban Council.

## IMPORTS.

## PORT OF DUBLIN.

September 6—Per City of Malaga, from Antwerp, 57 cases window glass, Arigo and Son; 286 cases do., T. Dockrell, Son and Co., Ltd.; 47 do. do., Plate Glass Co.; 7 do. do., Hoyte and Son; 52 do. do., Brooks, Thomas and Co., Ltd.; 60 do. do., T. and C. Martin, Ltd.; 16 do. do., to order; 219 steel girders, do.; 53 steel joists, do.; 8 cases plate glass, do.; 5 cases Limestone, do. Per County of Cork, from Connah's Quay, 80 tons bricks, J. M'Ferran and Co. Per Glenariff, from Middlesboro', 200 tons cement, T. Corry.

September 7—Per Mary Stewart from Carnlough, 95 tons whiting, T. and C. Martin, Ltd.

September 10—Per Norrida, from Ghent, 9,935 bags cement, 13 tons limestone, to order.

September 12—Per Lilla, from Bridgewater, 110 tons bricks,, J. Corry; per New Design, from Bridgewater, 105 tons bricks, W. and L. Crowe, Ltd.

September 14—Per Ville d'Eu, from Treport, 1 case plate glass, to order. Per John Bull, from Rochester, 200 tons cement, A. Agnew. Per Lady Hudson-Kinahan, from London, 600 sacks cement, T. Dockrell, Son and Co., Ltd.

September 15—Per Mantinea from St. John, N.B., 4,343 lbs. deals and ends, T. and C. Martin, Ltd. Per Doon Glen, from Whitehaven, 130 tons cement, T. and C. Martin, Ltd.

September 17—Per Malin Head, from Tampa and New Orleans, 518 pcs., 11,785 pkgs., wood, sawn, to order. Per Bangor, from Miramichi, 55,419 pcs. firwood, sawn, to order. Per Elidir, from London, 400 tons cement, W. and L. Crowe, Ltd. Per Spencer, from Belfast, 135 tons bricks, H. and J. Martin, Ltd.

September 18—Per Ellen Harrison, from Belfast, 150 tons broken bricks, Betson and Co. Per Bangor, from London, 340 tons cement, Brooks, Thomas and Co., Ltd.

## LATE BUILDING NEWS.

**Londonderry.**—The Technical Instruction Committee invite tenders for building a new technical school at Strand-road, according to plans and specification prepared by Mr. Edward J. Toye, architect, of 20 Great James-street, Derry. Tenders to be lodged on 5th October next.

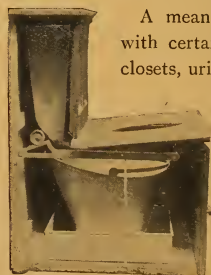
**Loughrea.**—Tenders have been invited for additions and improvements to Duniry and Abbey Churches, Loughrea, for the Rev. Patrick Egan, P.P. Plans and specifications have been prepared by Mr. Wm. A. Scott, M.S.A., 45 Mountjoy-square, Dublin.

**Newry.**—Tenders were received by the Board of Guardians for the erection of a new mortuary. The tender (£75) of Mr. Denis Neary was accepted.

**Newbridge.**—Major Eustace Loder has instructed Messrs. Kaye-Parry and Ross, 63 Dawson-street, to prepare plans for a new stud farm.

**Tallaght.**—A new courthouse, costing £1,000, has been erected at Tallaght, at the expense of the County Council. It is a neat and commodious building.

## Self-Acting Earth Closets.



A means of covering simply and with certainty the excreta in earth-closets, urinals, commodes, etc.

Further Particulars of  
Patentee,

**GEO. BRADLEY,**

1, Connaught Villas,  
Wick Road, Hampton  
Wick, Mx.

CONTRACTS.

URBAN DISTRICT OF BANGOR, CO. DOWN.

TO WATERWORKS CONTRACTORS.

The Urban District Council of Bangor (Co. Down) invite Tenders for the Construction of a Reservoir and Auxiliary Works at Ballysallagh Major, about four miles from the Town Hall, Bangor; also the laying of a line of 12-inch pipes from the intended Reservoir to Bangor Urban District Boundary.

Tenders to be framed as follows:—

Firstly—The Contractor to execute all work and to supply all pipes, iron-work, and other materials.

Secondly—The Contractor to execute all work and supply all materials other than the pipes and iron-work, which will be supplied to him at Bangor by the Urban District Council.

Thirdly—Ironfounders to supply and deliver at Bangor all iron and steel work, pipes, and valves, as described in Specification and Schedules.

Plans and Specification of the intended Works may be seen at the Office of Messrs. L. L. Macassey and Sons, 7 Chichester-street, Belfast.

Quantities for the intended Works may be obtained from Mr. S. C. Hunter, Scottish Provident Buildings, Belfast, from whom also a copy of the Specification may be had on deposit of £5 5s., which will be repaid on the return of the same.

The Council do not bind themselves to accept the lowest or any Tender.

Tenders, accompanied by priced Bills of Quantities, and Specification, to be lodged with me at the Town Hall, Bangor, not later than 12 o'clock noon, Tuesday, the 2nd October next.

By Order

JAMES MILLIKEN,  
Town Clerk.

Bangor, 3rd September, 1906.

ARMAGH URBAN DISTRICT.

ERECTION OF ARTISANS' DWELLINGS.

The Council of the Armagh Urban District will, at a special meeting to be held on 26th September, 1906, consider tenders for the erection of Artisans' Dwellings on Banbrook Hill, in the City of Armagh, the clearing and laying out of the site, the construction of roads, paths, sewers, manholes, and other works, in accordance with plans and specifications prepared by Mr. F. Bergin, B.E., 36 Westmoreland Street, Dublin.

The plans and specifications may be seen at my office on any day between the hours of 10 a.m. and 2 p.m., where copies of the Tender Form and Schedule of Quantities may be obtained by making a deposit of one guinea, which will be returned on receipt of a bona-fide tender. Tenders, accompanied by a schedule of prices, and containing the names and addresses of two solvent sureties willing to join in a bond for £1,000 for the due performance of the contract, will be received by me up to six o'clock on the 26th September, 1906.

Tenders should be addressed to the Presiding Chairman, and endorsed: "Tender for the Erection of Artisans' Dwellings." No tender will be considered which is not on the proper form.

The Contractor must pay all expenses in connection with the preparation and execution of, and stamp duty on, contract and bond.

The Council do not bind themselves to accept the lowest or any tender.

(By Order),

JAMES LENNON, Town Clerk.

Urban District Council Offices, Armagh,  
7th September, 1906.

QUEEN'S COLLEGE, GALWAY.

SESSION 1906-1907.

DEPARTMENT OF ENGINEERING.

ENTRANCE EXAMINATION.

19th OCTOBER, 1906.

The Matriculation Certificates of the Queen's Colleges, Belfast and Cork, and of the Royal University of Ireland, and of other Universities within the United Kingdom, are accepted by this College.

All Lectures, Scholarships, Exhibitions, and Prizes are open to Women.

JUNIOR SCHOLARSHIPS.

First Year—Two, value £20 each. Second Year—Two, value £20 each. Third Year—One, value £20.

The Examinations for Scholarships of the First Year will commence on the 24th October, of the Second Year on the 19th October, of the Third Year on the 22nd October.

EXHIBITIONS.

The Council may award Exhibitions to Students at the Examinations for Junior Scholarships.

Scholarships and Exhibitions are tenable for One Year, and Candidates must have Matriculated.

Lectures can be attended by both Matriculated and non-Matriculated Students, and all Lectures, Scholarships, Exhibitions, and Prizes are open to Women.

Information as to Fees, and Copies of the Prospectus may be had on application to the Registrar.

By Order of the President,

EDWARD TOWNSEND,

1st August, 1906.

Registrar.

CITY OF DUBLIN MUNICIPAL TECHNICAL SCHOOLS

RE-OPEN 24th SEPTEMBER, 1906.

CLASSES IN SCIENCE, ART, TRADE, COMMERCIAL, AND DOMESTIC SUBJECTS.

LOWER KEVIN STREET.

**Mechanical Engineering.**  
Mechanics, Steam, Practical Geometry, Machine Drawing and Design.

**Chemistry.**  
**Mathematics.**  
**Domestic Subjects.**  
Cookery, Dressmaking.

**Building Trades**  
Building Construction, Builders' Quantities, Carpentry and Joinery, Plumbing, Plasterers' Work, Painters' and Decorators' Work, Stone and Marble Carving, Metal Plate Work.

**Art and Crafts.**  
Modelling, Design, Geometrical Drawing, Freehand Drawing, Light and Shade, Cabinet Making, Wood Carving, Art Iron Work, Enamelling on Metal.

**Electrical Engineering and Physics.**  
Electric Light and Power Transmission, Wiremen's Work, Magnetism and Electricity, Sound, Light, and Heat.

**Miscellaneous Classes.**  
Tailors' Cutting, Manual Instruction, Boot and Shoemaking, Linotype Work, Grocery and Provision Business.

RUTLAND SQUARE.

**Commercial Classes.**  
Book-keeping, Shorthand, Typewriting, Commercial English, and Arithmetic;

**Domestic Subjects.**  
Cookery, Dressmaking, Millinery, Needlework,

**Business Methods,**  
Irish, French, German,

**Art.**  
Freehand Drawing.

A PREPARATORY COURSE has been arranged both in Kevin Street and Rutland Square to qualify students for the Higher Classes.

Abridged Prospectus, with Time Table and particulars of Classes and Fees, may be had at the Schools, Lower Kevin Street, the Branch Schools, 12 Rutland Square, or at the Public Libraries.

LOUIS ELY O'CARROLL, B.A.,  
Principal.



## ADVERTISERS' TRADE CARDS.

<b>ASPHALTE.</b> <b>THE LIMMER ASPHALTE PAVING</b> <b>CO., LTD.,</b> 2, Moorgate Street, London, E.C.	<b>LIME AND COLOUR WASHING.</b> <b>Vermorels "Eclair" Sprayer No. 3</b> <b>CHARLES CLARK &amp; CO.,</b> 20 Great Saint Helens, London, E.C.	<b>SANITARY ENGINEERS.</b> <b>GEORGE JENNINGS, LIMITED,</b> Lambeth, London, S.E. Agent: W. J. SHAW, Belfast.
	<b>LOOKS &amp; SAFES.</b> <b>HOBBS, HART &amp; CO., LTD.,</b> Arlington Street, Islington, London, N.	<b>SANITARY WARE.</b> <b>J. DUCKETT &amp; SON, Ltd.,</b> Manufacturers, Burnley, Lancashire. Catalogues on application.
<b>CHIMNEY &amp; DRAIN CLEANSING</b> <b>MACHINE.</b> <b>H. HART, 29 Settle's Street,</b> Commercial Road, London, E.	<b>PAVEMENT LIGHTS.</b> <b>THE BRITISH LUXFER PRISM</b> <b>SYNDICATE, LTD.,</b> 16 Hill Street, Finsbury, E.C.	<b>SEWAGE PURIFICATION.</b> <b>THE SEPTIC TANK COMPANY, LTD.</b> Agent: C. J. QUIRK, Assoc. M Inst. C.E., 18 & 19 Wellington Quay, Dublin.
<b>DAYLIGHT LIGHTING.</b> <b>THE BRITISH LUXFER PRISM</b> <b>SYNDICATE, LTD.,</b> 16 Hill Street, Finsbury, E.C.	<b>PHENOZONE SOAP.</b> <b>PHENOZONE SOAP CO.,</b> Wandsworth, London, S.W.	<b>SLATING AND ROOF TILING</b> <b>CONTRACTOR.</b> <b>JOSEPH TAAFFE, 36 Buckingham St.,</b> Estimates free. Dublin.
<b>FERRO-CONCRETE.</b> <b>YORKSHIRE HENNEBIQUE</b> <b>CONTRACTING CO., LTD.,</b> Leeds.	<b>PUMPS.</b> <b>THE PULSOMETER ENGINEERING</b> <b>CO., LTD.,</b> Reading.	<b>SQUARE CUT WOOD WORK,</b> <b>NEWELS, BALUSTERS, Etc.</b> <b>JONES &amp; LEACH, Newtown, N. Wales,</b> 20 Victoria Street, S.W.
<b>Geysers, Coppersmiths and Zinc-Workers.</b> <b>EWART &amp; SON, LTD.,</b> Contractors for Patent Copper Roofing, Ventilator Makers, Bath Makers, Japanners, Electric Lighting Engineers. 345, 348 and 350 Euston Rd., N.W. T.A. "Geyser, London."	<b>PUMPS (Trench) PORTABLE AND</b> <b>FIXED.</b> <b>THE PHENIX ENGINEERING Co., Ltd.,</b> Chard.	<b>STAIR TREADS.</b> <b>THE SAFETY TREAD SYNDICATE, LD.</b> 15, Barbican, London, E.C. Telegrams—"Unslipping."
<b>IRON AND WOOD BUILDINGS.</b> <b>HUMPHREYS, LIMITED,</b> 97 Stephen's Green, Dublin.	<b>LIGHTNING CONDUCTORS.</b> <b>W. J. FURSE &amp; CO.,</b> Traffic Street, Nottingham. Representative in Ireland— John McNeill, Ocean Buildings, Belfast.	<b>STONE BREAKING MACHINERY.</b> <b>W. H. BAXTER, LTD.,</b> Leeds.
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HEAD OFFICE

OCTOBER 6, 1906.

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## TOPICAL TOUCHES.

Last week the main drainage of Dublin was formally inaugurated.

\* \* \* \*

In this issue we publish an admirable lecture by Mr. W. J. Fennell, F.R.I.A.I., delivered at Belfast, on "Westminster Abbey."

\* \* \* \*

The Royal Institute of Architects has taken up the question of architects' position under the new Labourers' Acts, and has formulated certain proposals for the consideration of the Local Government Board.

\* \* \* \*

The ancient University of Aberdeen, which last week celebrated its quarter-century, conferred the degree of Doctor of Law (*honoris causa*) upon Mr. A. Marshall Mackenzie, of Aberdeen, the architect of the fine new buildings of the Marischal College and University.

\* \* \* \*

The Royal Commission on canals and inland waterways held its first sittings in Dublin on Monday last, when all the Commissioners were present. Mr. Tatlow, of the Midland Railway, and Mr. Tough, of the Grand Canal Company, gave exhaustive evidence. Many of us have looked to a development and encouragement of the canals of Ireland as a panacea for many of the ills resulting from high railway rates; but, frankly, after the evidence of Mr. Tatlow and Mr. Tough, one must reconsider the situation.

\* \* \* \*

Briefly, Mr. Tatlow says the Royal, which is owned by his company, is "no good," though up to date it had cost in capital expenditure and in maintenance hundreds of thousands. The Grand has cost more, and, although it is paying its way, is only half alive. Mr. Tough says it runs mainly through a bog, and will never be a flourishing concern. A canal boat, we are told, takes as many days to perform a given journey as a Midland goods train takes hours.

\* \* \* \*

We look forward with interest to the evidence setting forth the other side of the question. It is inconceivable that canals should be found of incalculable benefit in practically every other country, and apparently utterly worthless in Ireland.

\* \* \* \*

The building trade never was brisker in New York than at the present moment. The artisans are, 95 per cent. of them, foreigners. Wages are, generally speaking, good. For instance, carpenters receive £4 17s. per week, bricklayers £5 19s. 2d. They work 44 hours per week, as compared with 50 hours per week in London, but have to work harder during hours of labour, the American practice of "speeding up" being in full swing; besides which the cost of living is substantially higher, though not so much so as is usually alleged.

Professor Ryan, the Corporation Technical Education Expert, has entirely condemned the Bolton Street site as being wholly unsuitable and insignificant.

\* \* \* \*

The building trade in and around Dublin shows some signs of brisking up, though the general body of contractors complain as much as ever of the slackness of trade.

\* \* \* \*

As a supplement to this issue we publish three illustrations of Mr. W. A. Scott's Convent Chapel at Enniskillen, which, together with the same architect's work at Spiddal Church, has been the subject of so much eulogy on the part of Mr. Robert Elliott, and has generally aroused a good deal of attention and discussion.

\* \* \* \*

A memorial, signed by a number of Dublin architects, has been presented to the Council of the Royal Institute of Architects, asking that a deputation be appointed to wait upon the Dublin Corporation and urge that a competition limited to Dublin architects should be instituted for the proposed new Technical Schools.

\* \* \* \*

The great new Sessions House, Old Bailey, London, which replaces the old building so long known as "The Old Bailey," is now completed. It is a fine design of Mr. E. W. Mountford. The old Newgate prison is another old London feature that has disappeared. It was a remarkable treatment of simply a solid wall, unbroken by windows, and was designed by George Dance.

\* \* \* \*

In a letter to the "Freeman's Journal," a correspondent, writing from Ballymore-Eustace, claims that Captain Edward Lovett Pearce, who was an officer of Dragoons, was not only the designer of the old Houses of Parliament in College Green, but was also responsible for the supervision of the work; and, further, that he was the architect of the General Post Office. We fancy the writer is incorrect in the latter statement, as the Post Office is generally attributed to Francis Johnson, and is quite evidently a different hand to that of the designer of the Bank of Ireland, a far more thoughtful and beautiful work. In fact, the Post Office is decidedly commonplace.

\* \* \* \*

Every architect knows Phené Spiers' "Architectural Drawing;" to students it is the standard text on draughtsmanship, and to many of them it has been the first incentive to a good, clean, and workmanlike style of drawing. M. Spiers has just retired from the office of master of the Architectural School in the Royal Academy of London, of which position he was the first occupant. It is now impossible to conjecture the number of students he must have passed through his hands during his occupancy of the post, and his influence on the present generation of architects must have been enormous. His retirement is to be regretted, for it will be difficult to replace him.



Grafton Street has quite a "rebuilding" aspect, due to the number of demolitions in the street. These houses are all on the Corporation estate, and it is a condition precedent to granting new leases that they be rebuilt.

\* \* \* \*

A provincial sessional meeting of the Royal Sanitary Institute will be held at the Council Chamber of the New Town Hall, Belfast, on Friday next. "The Sewage Purification Problem, with special reference to sewage discharge into a tidal estuary," will be discussed, the proceedings being opened by Dr. James W. Williamson, a member of the Belfast Corporation.

\* \* \* \*

The discussion should be a very interesting one, as Belfast has had particularly unpleasant experience of the troubles which may result from the discharge of sewage into a tidal estuary, the cultivation of that noxious growth the *Ulva latissima*, owing to the sewage discharge, having much fouled the shores of the Lough.

\* \* \* \*

The general programme of the congress is an attractive one, and includes visits to the Corporation Pumping Works, the new Purdysburn Infectious Diseases Hospital (of which we lately published illustrations), the Queen's Island Works, the City Hall, the new Villa Colony Asylum, etc.

\* \* \* \*

Mr. Thomas Hardy, the novelist, was, it is generally known, an architect's pupil in his early days. He has lately been giving Mr. William Archer some impressions of those times. When he was a pupil he used, he tells us, to be sent round the country to measure the map as a preliminary to restoration, "which usually meant destruction." He says he felt very remorseful, but it was not his fault; he only obeyed orders. Mr. Hardy now, strange to say, proposes the erection of a tower to Holy Trinity Church, Dorchester, in which town he served his articles. Afterwards he went to London, and worked under the late Sir Arthur Blomfield, subsequently assisting Sir Gilbert Scott, Butterfield, Blomfield, Steel, and others. Forty-three years ago he won the Tite prize at the Institute, and in the same year the Institute medal and prize for an essay on "Coloured Brick and Terracotta Architecture."

### OUR ILLUSTRATIONS.

#### Enniskillen Convent Chapel.

This chapel is built of brick, rough-casted generally. The walls are divided in bays, with brick arches and fillings—bricks specially selected for colour qualities, and have small semi-circular windows in pairs, with sandstone jambs, glazed with Irish bottle-glass in figure designs.

The semi-circular apse is finished with cast concrete dome, having chain bar embedded therein at eaves, which have a projection of 2 feet all round the buildings, and are carried on cast concrete corbels.

There is a considerable slope on the ground, which allowed for the basement carried on piers, with open arching between.

The ceiling of basement is vaulted in concrete.

The roof covering is small, thick 12 inches by 6 inches Killaloe slates, with three rows of ton slates at eaves, and having lead ridge.

The roofing timbers are of pitch-pine, left from the tool without any varnish or coating of any kind. Already they have assumed a beautiful mellow tone. Otherwise the interior woodwork is chiefly cack. The carved panels in stalls treat of different subjects.

The altar is of limestone and Irish marble, with plaster relief in altar front. The architect was Mr. W. A. Scott, A.R.I.B.A., Dublin.

### THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND

#### The Draft Regulations of the L.G.B. for the New Labourers' Act.

At a special Council meeting of the Royal Institute of Architects of Ireland, held on the 25th ult., the draft regulations of the Local Government Board under the recent Labourers' Act were considered, and the following suggestions were drawn up, and the president was requested to convey them to the L.G.B. :—

Clause 48, Sec. 1 (a) "Associates" of the Inst.C.E.I. are not qualified to practise as engineers.

(c) Council is of opinion that a diploma or degree as described with the two years' experience on works is not sufficient qualification, and suggest that the paragraph should read, "and have three years' experience in an architect's office."

(d) That paragraph (d) be omitted, as eligible assistant county surveyors can be employed under paragraph (f).

(e) That the period of training in paragraph (e) be extended to five years.

Clause 49. That "shall" be substituted for "may" in the first line of Clause 49 after the words "District Council," and that the words "as already defined" be inserted after "competent person."

Clause 49 (b). That payment under paragraph (c) be by a sliding scale, with a maximum of 5 per cent. and a minimum of 2½ per cent., depending on circumstances, with expenses in addition.

Note.—We understand that the minimum fee of 2½ per cent. named by the Council was only intended to apply to the case of a very large number of cottages being built together.

### A REMARKABLE ROAD.

Closely adjoining the river wall on the northern shore of the River Suir at Waterford, the Ferrybank station of the Great Southern and Western Railway is so closely hemmed in by hills that the main highway from Clonmel formerly occupied nearly all the level ground behind the station premises. Consequently, when preparing plans for the important extensions that are now in progress for increasing the accommodation for passenger, goods, and cattle traffic, the railway company found it desirable to arrange for diverting the road in question, so that their establishment should not be split up into two portions, and for the purpose of avoiding the danger of a level crossing or the inconvenience of a bridge in the middle of the station. As may be surmised, from the proximity of the station to the riverside, it was not easy at first to see how the road could be diverted so as to pass in front of the buildings without the construction of a masonry embankment similar to those to be found in London on the northern and southern banks of the Thames. Any work of this description would have been far too costly; a timber structure would have been quite inadmissible, owing to its liability to decay and injury by destructive sea-worms, and the adoption of steel would have entailed heavy maintenance charges, even assuming that material to be acceptable by the highway authorities. A solution of the problem was ultimately found in the project prepared by Mr. L. G. Mouchel, of Westminster, who proposed to carry the new highway for a distance of 720 feet upon a viaduct built entirely of Hennebique ferro-concrete. The new structure was completed last month, one side of it being supported by ferro-concrete piles, driven about 60 feet into the ground, and the other side by similar piles driven for nearly 50 feet into the river bed, passing through silt and alluvial soil into compact and secure strata below. Above the piles there is a strongly braced framework of ferro-concrete, connected at the top by a platform of the same material, upon which the road surface and footwalks are laid in the ordinary way. In addition to its absolutely indestructible character, the viaduct is of immense strength, although of light and elegant aspect.

## WESTMINSTER ABBEY.

Last week in Belfast Mr. W. J. Fennell, F.R.I.A.I., delivered in the Central Hall of the new Municipal Technical Institute an able and instructive lecture entitled "Westminster," in which he dealt not only with the main features of the historic Abbey, but also traced the evolution of Gothic art in England, his remarks being illustrated by a series of splendid lantern views. This was the first lecture given in this handsome hall, and it is gratifying to be able to record that in every respect it was a great success. The demand for tickets was so large that the issue had to be stopped, and for the benefit of those who were unable to gain admission Mr. Fennell re-delivered the lecture on a subsequent occasion. The great interest displayed by the general public in such an architectural subject is quite unusual, but is probably due to Mr. Fennell's personality as a lecturer, for whether speaking to architects or to laymen, he is uniformly interesting—in fact, we know of no lecturer who can make an architectural subject more attractive to the general audience.

In the unavoidable absence of Alderman Sir James Henderson, D.L. (Chairman of the Library and Technical Instruction Committee of the Corporation), the chair was taken by Councillor John Thompson, J.P. (vice-chairman), and there was a large attendance, which filled the hall.

The Chairman said Sir James Henderson had been announced to preside, but he had found himself unavoidably prevented from being present. In asking him, as vice-chairman of the committee, to take his place, Sir James desired him to convey to all assembled his extreme regret at being unable to attend. The lecture that evening was of an exceptional interest from several points of view. First, it was the opening lecture of the sixth session of the Municipal Technical Institute; next, it was the first lecture to be delivered in that splendid hall, and, further, it afforded them once again an opportunity of hearing Mr. Fennell discourse upon the subject of Gothic architecture, a topic upon which he was admitted on all hands to be a high authority (applause). He (the chairman) did not propose detaining them with any lengthy remarks of his own, but he thought they would desire to know, and he felt it was right for him to tell them, that many of the illustrations to be shown on the screen had been specially sketched or photographed for that lecture by Mr. Fennell during several days spent in Westminster Abbey. It was only possible to procure those views at all by a special privilege which was rarely accorded to visitors to the Abbey. He thought that a knowledge of the great trouble that Mr. Fennell had taken would still further enhance their interest in the lecture, and cause them to examine the views with even greater closeness than they should otherwise have done. He would now ask Mr. Fennell to be good enough to proceed with his lecture, assuring him, as he felt sure he could do on their behalf, that he had before him an audience deeply interested in the subject he was about to explain to them.

Mr. Fennell said—The nation that had no history or had left no history, was a melancholy blank; and the nation—if such should ever exist—that wanted no history would represent the retrograde movement of sinking back to the contemptible condition of a loathsome savage. The subjects of the British Crown had a history that, as a nation, they would ever regard with pride of that, honest kind that would make them yield it to their successors as they got it—the heirloom of a people. He could not stop now to review that history of a thousand years, with all its strong contrasts of light and shade, of storm and trouble, of sunshine and tranquillity, but when they remembered that there stood a Gothic temple in London, the beating heart of England, inseparably and for ever bound up with it and all its teeming associations, the thousand years unfolded, and they saw the two going hand-in-hand from the dim legend of St. Peter begging to cross the ford, when he blessed the site in the seventh century, to the autumn of 1905, when the ashes of one of the great sons of the land was laid to rest beneath its transept pavement. This was the "Collegiate Church of St. Peter, at Westminster," better and ever to be known as Westminster Abbey—a

temple more venerated, more loved, more cared for, and more longingly desired for by honest, manly ambition than any sacred edifice in the world. Let them note that it was not a cathedral. It only held that dignified title for ten years. The Abbey was not always in London. Bit by bit London came to it, closed round it, and advanced westward of it, like the circle in the water, ever enlarging. The primitive London was on the north bank of the river somewhere near the Tower, and westward from it along the north bank stretched the strand or foreshore of the river, along which a bridle path ran, crossed by a tributary called the Fleet River, and, continuing its course west, the path winded between the strand of the tidal River Thames and the pasture land of Middlesex till it came to a brook known as Tyburn, between which and another branch of this river was a delta of land known as Thorney—or, modernised, Thorn Island. Tyburn, as they now knew it, was at the Marble Arch, a spot by which the burn flowed, and from here a road ran direct to where the church stood, to meet the great ford across the Thames. In later years, when a bridge was built at London, the road was diverted at the Marble Arch, and followed down the line of Oxford Street—an old military road—on to the city. This poor, marshy spot of land always had an importance attached to it. First it was the site of a Roman temple to Apollo, all trace of which had vanished. Later on it was the site of the Royal Palace, and being so near the busy and dangerous ford to the main highway of the land, the monks were quick to avail themselves of it when the time to do so came. The site of St. Paul's was coeval in its interest, and both were granted by Ethelbert, under the influence of Augustine, to his monks for places of worship. This fixed their first connection with Christianity, although there was a great Christian movement in England before Augustine's time under the influence of the early Church of Ireland. Legend then came in and declared that King Lucius founded the Abbey, which was destroyed by the Danes, only to be again refounded by King Sebert, with the visionary story of St. Peter coming in person and alone and forestalling the Bishop by consecrating the church himself, and, being a fisherman, he naturally directed another miraculous draught of fishes, and then disappeared. From this legend arose the dedication—the Church of St. Peter at Westminster. At any rate, they might regard it as certain that a Saxon Church did at one time exist in its rude, struggling form of thought. He always admired its honest attempt at architecture, and he would show a few examples of it, which brought them to the times of Edward the Confessor. It was curious how this Saxon King was possessed of Norman ideas—in fact, in him all Saxon traces had disappeared. He resided near his church at Thorney, the Island of Thorns, and cared more for the seclusion of the cloister than the guiding of his kingdom. In habit and spirit he was a monk, and he conceived the idea of pulling down the Saxon Church and building a great minster with its church to the glory of God and himself, for the primary wish was for his own resting-place, with a voice of prayer ascending through all time for the repose of his soul. He set to work and built the church. It was the first piece of Norman work in England. This was in 1060, and on its completion he was hurriedly buried in it. On the day following Harold was crowned in it. Thus they had in two days the first of a long line of entombments, and the first coronation of a great line of Sovereigns. After displaying on the screen a general plan of the Abbey as it now exists, Mr. Fennell pointed out that in Westminster the Gothic work of England was represented, first, by a few fragments of Norman work, then by examples of the early English, the decorated and the perpendicular. It possessed the first touch of Norman work that came to England and nearly the last of English Gothic, and these facts were from an architect's point of view vastly interesting, and should be so to the student of history. It was a curious fact that the great transitional period of Gothic art made no impression on the Abbey. It remained intact as a Norman work till the tide was in the full, strong flow of the early English period. When Henry III. conceived, like the Confessor, an idea of building so as to receive his own body, he pulled down nearly all Edward's work and rebuilt



in the new, making the chancel into a new chapel for the Confessor, who had been duly canonised, and Westminster lost the halo of St. Peter the Apostle in the greater reverence paid to the newer St. Edward. This chancel or chapel of St. Edward to which the body was removed, and where it still lay, became the great central feature of attraction. The eyes of the English were beginning to regard the Abbey as the Royal resting-place of its Kings, and thus the place became doubly sanctified and thought worthy of the choicest gifts. Under Henry was rebuilt the chancel, choir, transepts, chapter-house, and a portion of the nave, the remaining portion of which was added later on by no less a personage than their old friend, Dick Whittington, possibly better known for his love of cats than of high art. An account of the money he spent, amounting to £1,400 11s. 5½d., was still existing. Henry III. as a boy-king laid the foundation stone of the thirteenth century work which was now seen in the Abbey, and if Henry himself was a weak ruler, a man unfit to govern, he was surrounded by men—soldiers and statesmen—of gigantic strength of intellect, moulding and guiding the national aspirations. The character of all progressive nations was stamped on stone, and the hardihood, the vigour and sleepless energy, the strength and undaunted courage of the great thirteenth century found expression in its art, and nowhere with more striking intensity than in Westminster. There was a manliness in these early Englishmen and their work that stood up and looked one in the face with the honest gaze of fearless truth. That beautiful church was the first great triumph of early English Gothic work, and the great conception and grandeur of its thought and harmony glowed over one even now as one gazed at it and realised how all that was interwoven in the struggle of their fathers to proclaim that they were no longer born thralls or slaves, but Englishmen standing on their own rights, and defending them, not crouching nor begging, but upright, resolute, and firm in the determination to succeed or die. That was seen in their daring work, their walls, their buttresses flying over the roofs, their great soaring columns, giants of strength and courage, yet tenderly training up the little ones beside them, their gracefully-rising arches ever aspiring upward till the eye reached to and rested in the vaults of high-woven roof. It was ever rising to higher altitudes, with the impress of noble, lofty thoughts wrought in stone, ever moving onward, driven by the ceaseless activity of giant intellects, accomplishing almost infinite results. The lecturer conducted his audience through the various portions of the great building, pointing out the principal features of each section, and maintaining the interest of his hearers by the clear and impressive manner in which he dealt with the subject, while the numerous and beautiful pictures thrown upon the screen naturally enhanced the value of his descriptions. First describing the interior of the structure, he alluded in turn to the west end, with Wren's towers; the north transept, the east end, the chapter-house, and the Norman refectory. Proceeding to speak of the interior, he said he always thought Gothic work appealed to the senses more from its internal than from its external effects, and in a few forcible sentences he called the attention of his hearers to its chief characteristics. Down to Henry VII.'s time the prevailing idea was that Westminster should be sacred to Royal remains, and to a great extent that was accepted, but even Royalty could not alter God's irrevocable law of change. Little by little, by slow steps but sure, for a strongly established customs, especially English ones, required a lot to break them, the rule became absolutely reversed, and now no Royalty was ever buried in the Abbey, and its dignity had increased and its veneration been added to an hundred-fold since its doors opened to the people who were honoured by the people. In strange contrast to the pageants of Royal obsequies was that of one whom the nation loved, who not so long ago was laid quietly to rest in the transept in the dawn of a summer morning, and who, as a lonely, weary, hungry, delicate, and neglected little boy, a child of tender years, often wandered alone, wondering, by its grey, mysterious walls. Mr. Fennell described the nave, the north aisle, the statesman's transept, the choir, the poet's corner, the south aisle, the cloisters, the chapter-house, and

the other sections of the building, pointing out their different architectural features in so lucid a manner that even the youngest members of the audience could not fail to understand. In conclusion, he again returned to the poet's corner. He said there was no spot in the whole Abbey one loved so much, and as they left the Abbey their thoughts turned again to it, and its memories crowded back once more. They stood by Shakespeare's cenotaph, and they recalled how, destined at first to be exclusively the burial place of kings, it became the heritage of the people. Kindred genius gave to Spenser a grave beside that of Chaucer, and there were gathered round these the tombs or monuments of Beaumont and Drayton and Ben Johnson. In like manner were afterwards added memorials of Shakespeare and Cowley, of Dryden and Milton, of Prior and Thompson, of Gray and Burns, of Longfellow and Browning, and many others hardly less illustrious. Here, too, was commemorated the work of a crowd of other men of letters, such as Goldsmith, Johnson, Brinsley Sheridan, Campbell, Southey, Wordsworth, Keble, Lytton, Macaulay, Grote, Thackeray, Dickens, and Tennyson. In various parts of the Abbey was also from time to time recorded the fame of great theologians of many generations, and of schools of religious thought differing as widely as those of South and of Barrow, of Watts, and the two Wesleys. Of philanthropists, Wilberforce was buried there, and his statue stood nearly side by side with Forwell Burton. At the western entrance stood the marble image of Lord Shaftesbury, and in the centre of the nave was the grave of Livingstone. Together with these were found memorials of celebrated doctors, architects, engravers, sculptors and musicians, and of famous actors and actresses. Isaac Newton was buried beneath its floor, and his memorial held a conspicuous position, while the achievements of other illustrious men of science, as, for instance, Herschell and Darwin, and the great engineers Watt, Stephenson, and Brunel, had also been recorded. That was the looking back. What about the future? Was there a long line of men and women, yet unborn, whom the nation would claim the right of burying within the precincts of this Abbey? They earnestly hoped that that might be so, for they felt assured that England's greatness would bring her through many storms, steered by sons as resolute and good as those who weathered the hurricanes of the past, and they felt assured that the victories of peace would descend on the land with many blessings, and would, like those of war, bring its dead heroes and heroines to the Abbey, until the end at last arrived, for turning round and looking up they saw the calm, serene face of Shakespeare, full of thought and warning, as he pointed to his own prophetic words, that—

"These cloud-capped towers, the gorgeous palaces,  
This solemn temple, the great globe itself;  
Yea, all which it inhabit, shall dissolve,  
And like the baseless fabric of a vision,  
Leave not a wrack behind."

## REVIEWS.

We have been favoured by Messrs. Cassell and Company with three of the latest publications in their "Mechanics' Manual" series. They are, "Bricks and Brickmaking," "Range and Stove Fixing and Oven Building," and "Paper-hangers' Work." Each embodies, in convenient form for every-day use, a comprehensive digest of the knowledge of its particular subject, scattered over twenty-one volumes of *Building World*. They are edited by Mr. Paul N. Hasluck, editor of *Work, Building World*, and other technical papers, deal with their subjects capably and clearly, and are copiously illustrated. The books in the "Mechanics' Manual" series, including the three here mentioned, are published at 6d. each by Messrs. Cassell and Company, Ltd., La Belle Sauvage, London, and we can confidently recommend them to apprentices, students at technical schools, and all who desire information on the subjects with which they deal.

## OUR NORTHERN LETTER.

(FROM OUR CORRESPONDENT).

## The Ulster Secession.

The letter from Mr. Orpen, Hon. Sec. of the R.I.A.I., in last issue of the IRISH BUILDER, while testifying to his zeal, is not complimentary to his discretion. He quite ignores the fact that, as pointed out in the editorial note appended, I was merely a vehicle of statements which I did not father. A person who brings charges of inaccuracy should be careful that he is on certain ground. The Ulster Society of Architects have had Mr. Orpen's letter under consideration, and elsewhere, in the present issue, reply to it officially. Readers will then be able to judge how far each side is right or wrong. It is merely to draw attention to the reply of the Ulster Society that I mention the matter here at all.

## Newcastle Sewerage Scheme.

The Newcastle Urban Council, Co. Down, in reply to their recent advertisement for an engineer to design and carry out a new sewerage scheme for the town, received sixty-six applications, from all parts of the Three Kingdoms, the terms asked for varying from  $2\frac{1}{2}$  to 5 per cent. and upwards. The two candidates between whom the final vote was taken were Mr. T. H. H. Swiney, B.E., M.I.C.E., of Belfast, and Mr. G. Midgley Taylor, of Messrs. John Taylor and Sons, Westminster, both of whom asked 5 per cent. on outlay, and the usual expenses. In result, Mr. Taylor was appointed, and is being asked to waive his claim for out-of-pocket expenses. While the Council are to be commended for selecting an engineer at the usual professional charges, instead of, as some Councils do, a cheap man, it is to be regretted that they could not appoint an Irish engineer, there being more than one thoroughly competent candidate so qualified.

## Architects under the Labourers Act.

The publication in last issue of the draft rules proposed to be made by the Local Government Board under the new Labourers' Act was most instructive and suggestive. The majority of Rural Councils here in the North, as, apparently, largely also elsewhere, have mainly, in the past, appointed men lacking competent architectural training to design and superintend the erection of labourers' cottages. In a majority of cases the local assistant county surveyor has been given the work, and I have no hesitation whatever in saying that the majority of assistant surveyors are inadequate to discharge such a function. I do not for a moment question their competence in their ordinary duties. On the contrary, so far as I know them here, they are very good men. But their knowledge of ordinary building construction and proportion is practically *nil*. The District Councils who have as yet pronounced on the draft rules are, generally speaking, in favour of selecting the architect by competition, which means getting the cheapest man possible. Several Councils recommend that the County Council's sanction be obtained for the employment of assistant surveyors as architects, and these to be employed where at all possible. One Council, the Londonderry Rural Council, have gone further in recommending that the fees payable be 20 shillings for each house, and 10 shillings for each map of plot! Here is remuneration with a vengeance! The payment for map would do—but planning, specifying, and superintending erection of a cottage for 20 shillings!

## Accepted Tender.

The tender of Mr. B. Stafford, Belfast, for reforming, pitching, metalling, and rolling the lower parade of the Victoria Barracks, Belfast, has been accepted by the War Department at £1,389. This was the lowest of about fifteen tenders, ranging to over £2,000.

## Contracts Open.

The Police Committee of the Belfast Corporation invite tenders for the construction of an Underground Convenience in Donegall Square, N. Drawings, specification, etc., on view in the City Surveyor's office. Endorsed tenders to be lodged not later than 10 a.m. on Thursday, 11th October. Tenders are invited for building new stores and offices

in Little Donegall Street, Belfast, for Messrs. J. and R. Kane and Co., wine and spirit merchants. Plans and specification on view in the office of the architects, Messrs. E. and J. Byrne, 4 Waring Street, Belfast. Quantities obtainable from Mr. S. C. Hunter, Scottish Provident Buildings, Belfast. Date for receipt of tender not stated.

Tenders are invited for the erection of an additional warehouse at Adelaide Street, Belfast, for Messrs. M'Bride and Williams. Plans and specification can be seen at the office of the architects, Messrs. Young and Mackenzie, Scottish Provident Buildings, Belfast. Quantities are procurable from Messrs. W. H. Stephens and Son on payment of two guineas, returnable. Endorsed tenders to be lodged not later than Thursday, the 11th inst.

## THE "ASPHYXIATOR" (1905 PATTERN).

The above is the name and registered trade mark of a new patent machine for applying the smoke test to drains, and for disinfecting purposes. It is manufactured by the patentees, Messrs. John Watts and Co., engineers, 8 Nelson Street, Bristol, and is practically identical in principle with their well-known standard type machine. The 1905 pattern has, however, been designed to meet the requirements of those who favour a lighter apparatus than the original form, and the objects aimed at in its design are efficiency, compactness, simplicity of construction, and extreme portability. In weight the 1905 pattern is one-third less than the standard asphyxiator, and at the same time it gives just as large a volume of smoke. The combustion



chamber, in addition to being fitted with Messrs. Watts' Patent Internal Fire Box, is provided with a cover of special construction, to which is fitted suitable means for regulating the air supply necessary to support combustion of the fumigating material. For convenience of transport, the machine is readily divided into two parts.

It is unnecessary here to refer to the great success which has attended Messrs. Watts' Asphyxiators from their introduction to the present time. They have been adopted by the principal sanitary authorities, Town and Urban District Councils, etc., throughout the United Kingdom, and have, in addition, been supplied to the principal naval and military stations, both at home and abroad, of H.M. Government. The 1905 type combines all the merits of the older patterns, with extreme ease of transportation. Prices and full particulars can be had on application to Messrs. Watts at the address above given.

On Monday last one of the improvements in the Postal Service promised by the Chancellor of the Exchequer in his Budget speech, came into operation in the shape of revised regulations for the halfpenny post. Under the new regulations the list of formal commercial and other documents admitted to the halfpenny post will be enlarged, so as to include practically all formal partly-printed documents in general use in business, and more liberal rules will be introduced as to the written additions allowed on circulars and other printed documents.



## FERRO-CONCRETE CONSTRUCTION IN DUBLIN.

On the 24th ult. a unique opportunity was afforded many of the Dublin architects, at the invitation of Messrs. Batchelor and Hicks, to witness a test of the floors of the new buildings recently erected for Messrs. Helys, Ltd., in Dame-lane. With the exception of the roof, the whole of the walls, piers, and floors of these premises have been constructed of reinforced concrete on Hennebique's system. This is the first example, we believe, of its use in Dublin, although large warehouses have previously been erected in Waterford, Sligo, and Belfast, and at present a large marine work is being executed by the Board of Works at Passage East, in the same system.

The visitors included Mr. W. M. Mitchell, Pres. R.I.A.I.; Mr. A. E. Murray, Mr. Owen, Mr. Cairns, Mr. F. Batchen, Engineer to the Board of Public Works; Mr. H. Alberry, Mr. A. Robinson, and many others interested in the subject. They were met by Mr. Frederick Batchelor, F.R.I.B.A.; Mons. Mouchel, who travelled from London to personally superintend the test; and the representative of the Contractors, Messrs. J. and R. Thompson.

The building, which is rectangular in shape, is five storeys in height, including the basement, and is designed for printing purposes, the safe load per foot super. on the ground, first, and second floors being estimated at  $2\frac{1}{2}$  cwt., per ft. super., and for the upper floor at  $1\frac{1}{2}$  cwt., a provision somewhat larger than is necessitated in the majority of buildings of this class. The floors are supported on transverse ferro-concrete beams 11 inches deep by 7 inches wide, resting on reinforced piers, averaging 16 feet apart. These are 16 inches square on the basement, and diminish on each floor by two inches to eight inches square on the third floor. The bays of the flooring are each further divided by two ferro-concrete beams 8 inches deep by 5 inches wide, connected at their ends according to the patented method, with the larger transverse beams, and are introduced for stiffening purposes. The area of load between supports which was tested measured 17 feet 3 inches x 11 feet 4½ inches, or 196 feet super. The total estimated load at  $2\frac{1}{2}$  cwt. per foot would therefore be 24½ tons, but the chief element of the test was the ability of the floor to bear an increase of 50 per cent. on this standard, or 36½ tons, with a maximum deflexion of  $\frac{1}{80}$  of the span, i.e., .321 ins., or 8.2 mm. The experiment was conducted by means of three iron rods, one of which was attached to either end of the beam about 12 inches from the point of support, and the other at the centre. These rods impinged on recording arcs, divided into .2 millimetres. As the weights were gradually applied, and distributed over the whole area, a slight deflexion was recorded, as the floor settled or "squeezed" into position, but subsequently the increase became practically imperceptible. When the estimated safe load had been attained, the centre arc recorded a deflexion of 1.2 mm., and at the completion of the test with  $3\frac{1}{2}$  cwt. per foot over the area of load, the centre arc indicated a deflexion of 1.9 mm., and those at the ends .5 mm. and .42 mm. respectively. This centre deflexion of .0741 in. is equal to only  $\frac{1}{2604}$  of the span; the test, therefore, caused something less than one-quarter the permissible deflexion under the contract. These figures are so infinitesimal as to be scarcely worth regarding, except as an indication of that slight flexibility which is necessary for perfect security. It should be noted that this floor, which is homogeneous with the walls and supports, has been laid for only ten weeks, and that the thickness is but four inches. On being relieved from the load the floor regained its normal position.

The beams are formed on the usual trussed principle, of four small steel tension bars connected by stirrups. The piers for the lower floors are formed of six 1½ inch rods, coupled at various points in their height with steel bands. The essential elements of perfect construction in this system are the quality of the materials employed and careful workmanship. In Messrs. Helys' building the concrete was composed of one part Portland cement, Casebourne's Pioneer brand, to four of Kilcool gravel, ¾-inch cube, and two parts clean sand. The proportions, however, vary according to the aggregate obtainable, and the decision invariably forms the subject of careful experiment by the patentees. It was somewhat unfortunate that the building had progressed too far to enable the visitors to inspect the details of construction, but these were explained by Mr. F. Batchelor and Mons. Mouchel, aided by the many diagrams hung on the walls of the building. The ferro-concrete contractors, Messrs. J. and R. Thompson, of Dublin and Belfast, who are the licensees of the Hennebique system for the district, are to be congratulated on the excellence of their work, and the architect is entitled to the thanks of the profession for his courtesy, in enabling so many members to avail themselves of an opportunity to see ferro-concrete satisfactorily emerge from so severe a test. In subsequent conversation with Mr. Batchelor, we learnt that the system of building adopted in this particular form of warehouse construction, in which heavy loads have to be carried, effected an economy of 15 per cent. compared with what we must now call antiquated methods, an item of news not without significance to those who design and those who build.

## IMPORTS.

## PORT OF DUBLIN.

September 19th, per Glenarm Head, from Montreal and Quebec, 40 logs firwood hewn, 9 logs ash, 80 lds. oak, 51,120 pieces deals, to order; per Winga, from Goteborg, 11 cases 7 bags turned wood, 21,021 pieces 552 bundles planed boards, 3,500 bundles laths, 371 bundles mouldings, to order; per Sentry, from Glasgow, 110 tons fireclay goods, A. and C. Taylor.

September 24th, per Val de Travers, from Treport, 100 bags plaster of paris, to order; per Glenariff, from Middlesboro', 275 tons cement, J.P. Corry and Co., Ltd.; per Marion, from Bridgwater, 85 tons bricks, J. MFerran and Co.; 21 tons do., Monsell, Mitchell and Co.; 22 tons do., Wallace Bros.

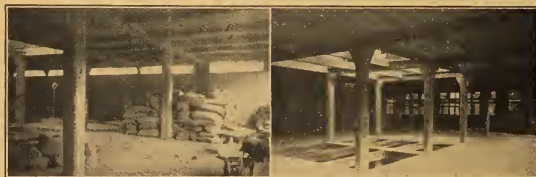
September 25th, per Elaine, from Dunkirk, 50 tons slates, to order; per Elaine, from Rochester, 400 tons cement, N. M'Naughton and Co.; per Lady Wolseley, from London, 76 kegs lead, T. Dockrell, Son and Co., Ltd.

September 26th, per City of Hamburg, from Rotterdam, 3 cases window glass, to order; per Gliton, from Quebec, 4,603 pieces deals, 7,291 pieces battens, to order; per Glen Head, from Riga, 45,855 pieces deals, to order.

September 27th, per Lord Londonderry, from Baltimore, 496 pieces oak and 222 bundles poplar lumber, 316 tons roofing slates, to order; per Nelisheli, from Port Dinorwic, 100 tons slates, T. and C. Martin, Ltd.

September 28th, per Elsa, from Skeftea, 3,141 pieces deals, 34,646 pieces boards and battens, 70,345 pieces planed boards, R. Martin and Co.

October 1st, per City of Frankfort, from Antwerp, 24 cases window glass, T. Dockrell, Son and Co.; 47 do., do., P. Ceppi; 10 do., do., C. Bull; 5 do., do., Combridge and Co.; 20 do., do., McCulloch and Nairn; 180 do., do., Brooks, Thomas and Co., Ltd.; 6 do., do., D. Behan; 20 do., do., T. and C. Martin, Ltd.; 40 do., do., J. Kelly and Son; 30 do., do., W. Collins; 11 do., do., De Grule Hondrit; 25 do., do., H. Sibthorpe and Son; 30 do., do., W. Martin and Son; 4 cases plate glass, 550 bags cement, 352 joists, 14 cases limestone, to order.



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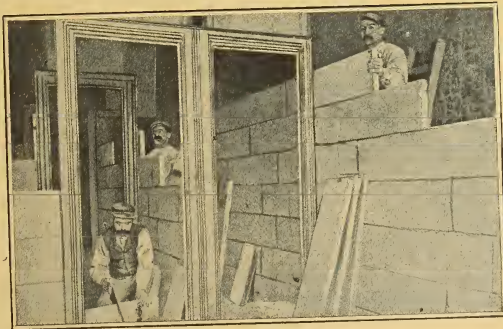
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## THE NON-CO-ORDINATION OF IRISH BOARDS.

Lord Dunraven tells us that there are in Ireland some forty-two public governmental boards, semi-independent and without any system of co-ordination. Politicians of a certain school clamour loudly for some form of such co-ordination and popular control. The columns of this journal are, however, not the place to discuss such matters of political affairs, or even to offer so much as a hint as to which side is right and which wrong. We only refer to the matter to give point to the observations of a Dublin architect who has drawn our attention to an anomalous state of affairs existing in one public Board with which architects have occasionally to do with. Our correspondent refers to the office of the Inspectors of Lunatics in Ireland.

Prior to the passing of the Local Government (Ireland) Act, the district lunatic asylums throughout Ireland were under the nominal control of local boards of governors, who derived their authority through direct nomination by the Lord Lieutenant; we say "nominally controlled," because it is a matter of common knowledge that these boards of governors, although made up of the leading men of the respective counties, had little or no real power beyond the management of the domestic work of the asylums, and simply, in many instances, registered the decision of a central and very autocratic, but now defunct, body euphoniously and aptly known as the "Board of Control"—and very emphatic was their control. Generally, the Board of Governors were not allowed to select their own architect, to decide whether they would or would not build a certain additional building, how or when it should be built, and the like, including the not insignificant question of cost.

The Board of Control had, of course, the right of veto in respect of all plans, which must in all cases be first approved of by them before one stone could be laid. The Board were assisted in the general work of the Department by medical officers known as "Inspectors of Lunatics," and on the resignation of office as a Commissioner of Public Works of the late Mr. Samuel Usher Roberts, he was appointed Consulting Architect to the Board of Control.

With the passing of the Irish Local Government Act all things changed, the Board of Control passed away, local popularly-elected "joint committees of management" were set up and given much wider powers of administration. But here comes in an extraordinary anomaly. The necessity for some form of control over the local bodies was felt to be desirable, and provision was made that this should be exercised, nominally by the Lord Lieutenant, but really by the Inspectors of Lunatics, whose services were retained. These gentlemen, in turn, feeling the necessity for technical help at times, retained the services of Mr. J. W. Gardner, who for some time previously had assisted Mr. Roberts. But strange to relate, no provision whatever was made for the establishment or endowment of such an office, and simultaneously with Mr. Gardner's advice there is contemporary control by the Local Government Board in respect of architects' designs, for all designs must first be passed by the Lord Lieutenant, through the Inspectors and Mr. Gardner, and then run the gauntlet of the L.G.B. criticism if any loan of public money is required to carry out the work.

We have not heard that this dual control has so far led to any trouble, though it is quite conceivable that it easily might. For instance, some of the very changes introduced by architects at the instance of the Inspectors or their technical adviser, might form the bone of contention with the Local Government Board. The present system, at least, had the loss of time and some additional expense. The Inspectors are a practical body of experts, and have so far pulled very well with the local authorities, since the removal of the Board of Control. Would not the commonsense course be to put them in a position to legally establish and appoint an adviser, assisted by whose technical knowledge they might pass final judgment on all designs submitted to them, thus limiting the Local Government Board's functions to an inquiry into the financial aspects of the case. The Local Government Board maintain a staff of engineering inspectors, but no architect expert in lunatic asylum planning. Hence the Board should be glad to be relieved of responsibility in respect of the architectural fitness of designs submitted to them.

## COMMENTS.

### Foxrock Drainage—Curious Complication.

A curious state of affairs was under consideration by the Rathdown Rural District Council the other day. In July tenders were invited for carrying out the drainage of Foxrock, a job of some £6,000 in value. On consideration of the tenders, the Council decided to accept that of Mr. P. Dowd, of Dublin, which was the third lowest, the estimates of Mr. P. Kelly, of Kilkenny, and Mr. H. Pemberton, of Ballybrack, being

each below the accepted proposal, the difference between Mr. Dowd's and Mr. Kelly's being £1,400 odd! The decision to accept Mr. Dowd's tender was carried by a majority. At the time a letter from a Dublin correspondent appeared in our columns. Subsequently notice of motion to rescind the resolution was given, Mr. Dowd's tender was cancelled, and Mr. Kelly's accepted. Next comes a rather curious complication. Mr. Kelly had in the interval tendered for and secured the contract for the drainage of Clontarf, a much larger job—some £43,000. On receiving notification of acceptance of his tender for Foxrock, Mr. Kelly replied, expressing his inability to undertake the work, having regard to the large undertakings he had in the interval become responsible for. This threw everything back into the melting-pot again. The Council then reconsidered the matter for the third time, and again accepted Mr. Dowd's tender. Mr. P. Hussey, one of the Council, and himself a contractor, proposed an amendment that the lowest tender, that of Mr. Pemberton, of Ballybrack, be accepted, but this was lost on a division, only Mr. Hussey voting for the amendment.

#### The Housing of the Labouring Classes in the North.

When the recent Labourers' Bill was passing through the House of Commons, attention was drawn to the fact that little or no advantage had been taken of the provisions of previous Acts by the rural districts in either the North or West of Ireland. When the figures were published, they naturally gave rise to some little surprise. While the large unions in Munster and Leinster had been building, sometimes hundreds of cottages in a single district, the Acts had in Ulster and Connaught been practically inoperative. In the case of Connaught, while the housing is, of course, quite as bad, and even worse than, in the other provinces, they have the explanation to offer that every man is, practically speaking, a farmer on his own account, and that, therefore, "agricultural labourers" in the strict sense are practically non-existent. In the North, however, it is different, and that a real need for cottages exists is amply shown by a recent report of one of the Local Government Board Inspectors, Mr. Barnwall Crofton, who recently held an inquiry into an improvement scheme for the erection of 33 labourers' cottages by the Dungannon Rural District Council. He recommends 28 of the applications, and states that although the Council had unanimously adopted the scheme they did not show any desire to carry it to a successful issue. On the contrary, not only did the great majority of the Councillors absent themselves from the inquiry, thus leaving the scheme to take care of itself, but half the members who did attend actively opposed the scheme. The evidence given established the fact that very few of the houses occupied by the labouring classes in Dungannon Rural District were in a fit condition. He regretted that the Council seemed to hold the idea that any dwelling, no matter how dilapidated, was good enough for a labourer, and he hoped that they would take a more liberal and more humane view of their responsibility when considering the further applications made since the adoption of the present scheme.

#### The Economy and Utility of Cast Concrete Blocks.

In a very interesting letter, Messrs. James P. Corry and Co., Ltd., 8, City Quay, Dublin, takes us to task for some of the remarks contained in a leading article in our last issue on the subject of the use and manufacture of cast concrete blocks for building purposes, in which we stated that we were unconvinced as to the advantages which it is claimed cast concrete blocks possess over either brick or ordinary concrete. The genesis of our observations was the review of an American work on the subject, which had been sent to us for that purpose. We did not pose as experts on this particular phase of the use of concrete, but with some

extended experience of the ordinary concrete of commerce, recorded the impressions which the book produced upon us. Messrs. Corry say that if we witnessed a practical demonstration on the machine which they are offering, and examined some of the blocks which have been made by it, we would in all probability change our opinion as to whether or not it is an improvement on brick, independent of cost and convenience. Messrs. Corry say (and they are correct in the surmise) that the house we referred to on Rock Road is the one being put up by Mr. Langley. If so, they point out that *only* the base of the house is built to give a stone (rock-faced ashlar) appearance. The upper portion is made roughly to take dash. Therefore, if we are judging by the upper portion we are not giving their machine the credit which it deserves; and so far as being known is concerned, they must disagree with us there, for the simple reason that they cannot get these machines forward from America as quick as they can sell them, and at the present time there are the following works in course of construction, as well as some villas, terraces, etc. (12 machines in use at present):—Presbyterian Church, Letterkenny (M'Dowell, Leather and Fraser, builders); Blackwood and Jury, (architects); Monarch Laundry, Belfast, and one in County Down (J. and R. Thompson, builders); Robinson and Marshall's warehouses, Arthur Street and Chichester Street, Belfast (M'D., L. and F., builders). We may say we quite understood the amount and position of the cast concrete blocks being put into the house referred to, which we only mentioned because it was the only place we had ever seen these blocks used in this country. Of course it is obvious that cast concrete blocks, with rock-faced ashlar face, have this advantage—if it be one—that they convey somewhat the impression of a stone front; but, on the other hand, there are many architects who would deem this rather a disadvantage. However, as Messrs. Corry tell us that Messrs. Geo. Rome and Co., who are using their machines (which cannot be termed either a wet or a dry machine), will be glad to show them working at an early date, we purpose availing ourselves of this kind offer, pending which we defer making any further remarks on the subject. When we have seen the machines at work, we hope to give our readers some useful information as to their general utility and economy.

What appears to be an interesting glimpse into the remote ages of the past has been gained by the discovery in Australia of some pieces of timber 300 feet below the surface, which have every appearance of having been sawn and shaped by the hand of man. They were found in the sand and loose basaltic gravel of the bed of an ancient river (now being worked for gold), the course of which is now followed on the surface by the Loddon, a tributary of the Great Murray River. From the marks on the pieces it would appear that they are either ring rosewood or river oak, more commonly called "she oak," and what seem to be saw marks are plainly visible in several places, whilst what lends still further reality in this assumption is the manner in which the wood has been split off when the saw had done its work sufficiently to allow of this being done. How pieces of sawn timber could be found at such a depth from the surface is one of the mysteries that perhaps geologists may be able to explain, and even the presence of the wood itself at that depth, and in that position, is sufficiently interesting to be worthy of inquiry. The timber is very sodden, but hard, the outer surface being impregnated with white sand. Above the drive in which the wood was found are successive layers of drift sand, and on the top of this is a layer of basalt 100 ft. thick, showing that at one time there must have been a tremendous upheaval, the debris covering the whole valley, and the basalt being spread over this like crust on a pie. It is, of course, impossible to say for what purpose the wood was used, but, from inspection, one piece certainly had something of the appearance of a river pile, one end having been cut and smoothed, whilst the other was left in the rough state. Another piece was more in the shape of a plank, smooth on one side. Possibly the one was driven into the river bed to act as a pile for the support of the other, thus forming a primitive bridge across the stream, which was then, of course, on the earth's surface. This is no more than a haphazard theory, but it is probably as near the truth as any other.



### ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

The holiday season is over, and in another week the tenth session of the Association will be in full swing. The weary secretaries have already written *finis* to our annual Green Book, itself a sign that the opening meeting is upon us. Certainly members will have no cause of complaint as to the fare that is provided for them at the general meetings. It is not proper to anticipate what will soon be common information; but one rare achievement may be noted, that every date is filled, and well filled, and that one of the greatest authorities on English architectural history has promised to come over and read a paper early in the session.

\* \* \* \*

As foreshadowed in a previous issue, we understand the committee has decided, for this session, to abandon some of the classes. For some reason the whole education question is once again in the melting pot. What with an A.A. syllabus—or ought it to be called a draft syllabus?—the question of an Irish chair of architecture, and that perennial, the Irish examination, it is well to clean the slate and wait for a while. The day of more or less aimless scribbling is over. Something must be written soon, and "writ large."

\* \* \* \*

However, one class has survived, that of design, of which Mr. Munden is the hon. secretary. With unsparring energy he has persuaded a number of visitors to attend this class and set subjects, who have not been within the four walls of our premises for a long time. This being the only class for the winter, it should establish a record; at all events, a student who prepares careful sketches for each evening will have an asset which will prove most valuable when the halcyon days of pupillage are over, and the question of bread and butter arises.

\* \* \* \*

There is some rumour that the library floor is to have a carpet. Is there no member who could spare a lounge chair or two, in which "Rivington's Building Construction," Vol. IV., could be read in comfort, and the subtleties of "Ferro-Concrete" be leisurely grappled with? It is possible that with rigid economy elsewhere, the library might be made a little more homely, and the bookcases filled. The gaps are at present lamentable.

"WEE MACGREGOR."

A new parish church is about to be erected at Timoleague, Co. Cork. The plans have been prepared by Mr. M. A. Hennessy, South Mall, Cork. The style selected is Celtic-Romanesque, which has been treated in a way that should make the building most interesting, both externally and internally. The building will consist of nave, aisles, transepts, chancel, side chapels, round tower in three storeys, the upper of which is a very ornamental arcade of cut stone, within which the bells will be placed. We direct the attention of builders to our advertisement pages, in which tenders for the works are invited.

We are pleased to learn from the Laganvale Estate Brick and Terra-Cotta Works, Ltd., of Belfast, that, notwithstanding the dull state of the building trade which has prevailed for so long, they are very busy, and at present and for some time past, have been turning out an average of 150,000 bricks per week. Their facing bricks and terra-cotta are well known throughout the North of Ireland, and amongst the building contracts at present being carried out on which Laganvale bricks are being used may be mentioned the following:—Queen's College, Belfast, extensions; architect, Mr. Robert Cochrane, Board of Works, Dublin; Messrs. R. Corry, Ltd., builders. Co. Antrim Asylum extensions; architect, Mr. Basil Wilson, Belfast. Shore Road pumping station for Belfast Corporation. The Abbey Workhouse. New Club-house at Omagh; architect Mr. G. Ferguson, Belfast; Mr. H. Keith, of Belfast, builder. New Northern Bank, Banbridge.

### MR. E. S. GLANVILLE'S STONE AND MARBLE WORKS, ERNE STREET, DUBLIN.

At the present time, when the subject of the revival of Irish industries is so much discussed, and so many practical attempts are being made throughout Ireland to foster home industries, it is hardly out of place to remind our readers that the Irish building stones are amongst the finest in the world. In Dublin alone there are many splendid buildings in the erection of which only Irish stone, such as granite, limestone, and marble, was used, and the most severe critics cannot find fault with the materials used in these buildings. Mr. Glanville's stone and marble works is probably one of the best-known establishments of its kind in Ireland. He has always large stocks of limestone, sandstone, Bath, Caen, and Portland stone on hands, besides Irish and foreign marbles, and the various machines in his works for sawing, working, and polishing stone and marble are of the most up-to-date patterns. During a recent visit to the works we were shown some specimens of worked stone and polished marble that should please the most fastidious of architects. Amongst the recent building contracts for which Mr. Glanville has supplied stone may be mentioned the widening of Ballsbridge, in which Irish limestone was largely used, and for which the architects were Messrs. Kaye-Parry and Ross, and the contractors, Messrs. J. and W. Stewart; St. Celemán's Church, Drumcondra (Messrs. Ashlin and Coleman, architects; Messrs. Connolly, builders); Portland stone dressings for the Royal Victoria Eye, Ear, and Throat Hospital, Dublin (Mr. F. Batchelor, architect; Messrs. J. and P. Good, Ltd., builders); limestone balustrades for North British and Mercantile Insurance Co.'s building, Dublin (Messrs. Collen Bros., builders); and also for Messrs. Pigott and Messrs. Dudgeon's premises in Grafton-street (Messrs. J. and P. Good, Ltd., builders); marble pavements at Baronstown House, Mullingar (Mr. A. E. Murray, Dublin, architect; Mr. S. Hill, Cork, builder).

### THE GRANTHAM DISASTER.

In some respects the causes leading to the wreck of the Scotch express just beyond Grantham station were similar to those responsible for the Salisbury accident. The train was travelling at a speed far too high for the curve on which it entered. It commenced to rock, dashed into the parapet wall of a bridge, and broke into three sections—the engine overturning on the line, the front carriages rolling down a steep embankment, and the rear carriages remaining in a perilous position at the edge of the slope. At Salisbury, excessive speed on the proper road for the train was the cause of the derailment. At Grantham, the disaster was due to the non-stoppage of the express at the station, so that while travelling at high speed it entered a short and sharp curve which is not safe for speeds of more than fifteen miles an hour. This curve is on the Nottingham branch, where the points were set open to let a train in and would have been closed before the departure of the North express. Whether the practice of working the points thus was a wise one is doubtless a matter that will receive consideration by the Board of Trade and the Great Northern directors. That their position contributed to the accident is certain, but in justice to the company it should be remembered that the continued progress of a train despite adverse signals and running orders is a contingency that could scarcely have been anticipated. In other respects no precaution seems to have been neglected by the railway company. The signals were against the train, the brakes were in perfect order, and so also was the engine. It is now generally agreed by those best qualified to judge that steam had been shut off before the train passed through the station, but, at the same time, that the brakes were not applied until the train was close to the south end of the platform. Even then, if circumstances had been favourable, and the speed a little less, the train might have been pulled up before the fatal curve was reached. As it turned out, the line was greasy owing to drizzling rain, the brakes were put on too suddenly, and the last hope was gone. The driver was one of the most trustworthy in the company's service. Whether he was trying to cut things too fine, or forgot all about the brakes until it was too late, and then applied them suddenly in desperation, or temporarily lost his head, are questions which can never be answered.—*The Builder.*

# THE ULSTER SOCIETY OF ARCHITECTS AND THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.

## A Reply from Ulster.

Mr. W. Hartley Patterson, Hon. Secretary of the Ulster Society of Architects, has addressed the following letter to Mr. R. Caulfield Orpen, M.A., Hon. Sec., R.I.A.I.:

"At a meeting of Council of the Ulster Society of Architects, held on 28th Sept., a letter, stated to be unofficial, but signed by you as Hon. Sec., R.I.A.I., and published in the issue of the IRISH BUILDER AND ENGINEER of date 22nd September, was considered, and I was directed to address to you the following communication, a copy of which I was also instructed to forward to above paper for publication.

"My Council regret exceedingly the forwarding of your communication to the public Press, containing, as it does, such mis-statements and glaring inaccuracies, only condoned by the evident haste and lack of consideration with which it has been written, tending, as it does, to engender contention between the two Societies, which, in the interests of the profession in Ireland, is much to be deprecated, and they consider that there does not appear any good reason why, on the contrary, the Irish Institute and the Ulster Society should not, each in their own geographical area, seek to emulate each other to obtain the furtherance of a common object by vigorous individual or combined action as occasion may require.

"The most important fundamental question dealt with in your communication is that of the direct affiliation of the Ulster Society with the R.I.B.A. Sir Thomas Drew, to whom the Ulster Society is indebted for much assistance and counsel, principally at its inception, acting for, and speaking as the mouthpiece of, the Irish Institute, of which he was then president, and also as a Member of Council of the R.I.B.A., at meetings held to promote the Ulster Society, informed those present that the R.I.B.A. was most anxious that the profession should be separately organised in the North of Ireland, and that such was the intention of the R.I.B.A. is demonstrated by the paragraph contained in the R.I.B.A. Calendar, down at least to the year 1901, under the heading of "Allied Societies," which reads as follows:

In Ireland the Royal Institute of the Architects of Ireland has Dublin for its centre, and, "until the development of local societies," the whole of Ireland for its province.

"Sir Thomas Drew explained that as soon as the Ulster Society was properly organised, and able to carry on its own business, direct affiliation with the R.I.B.A. should take place. In 1904, when a proposal was made by the Ulster Society of Architects for direct affiliation with the R.I.B.A., under an arrangement which would not have impaired its connection with the R.I.A.I. Sir Thomas Drew warmly supported the proposal, and down to the present time we have every reason to believe his opinion has in no wise changed.

"The R.I.B.A. was prepared to grant the affiliation under this proposed arrangement, and wrote to the R.I.A.I. informing the Council to that effect, and hoping that such an arrangement would not impair the good feeling existing between the two societies.

"Much to the surprise of the Council of the Ulster Society of Architects, the Irish Institute Council showed itself determinedly opposed to permitting the Ulster Society to obtain any of the advantages derivable from such direct affiliation, and drew up a scheme in opposition, which proposed to entirely subordinate the Ulster Society, and which, in practice, would have been absolutely unworkable, as every communication from the British Institute would, under it, have had to pass through the Irish Institute; such circumlocution with an energetic and progressive society like ours—especially having regard to the examinations of the British Institute carried on by us, which the Irish Institute has not been doing—would have been intolerable; it, therefore, became simply a choice of time when these unnecessary restrictions would be thrown off by the Ulster Society.

"Your reference to 'Mr. Gilliland's application for Fellowship of the R.I.B.A.' is unfortunate in its terms. I am instructed to say that Mr. Gilliland never applied for the Fellowship, but that the Council of the Ulster Society, unknown to him, in recognition of services which they considered he had rendered to the architectural profession, applied for his election to the Fellowship, and if it had been possible under the Institute Bye-laws, the honour would have been conferred on him without his knowledge. To its

regret, it became necessary for the Council to request him to sign the necessary forms. I am further to point out, that if the Ulster Society had had direct affiliation, he would have been elected immediately a Fellow R.I.B.A., on becoming president of the Ulster Society, by virtue of that office, and this disability, one of the many under which the Ulster Society laboured, the R.I.A.I. sought to perpetuate, was accentuated by the action of the Council in sending a telegram and letter protesting against Mr. Gilliland's election, at the very time when he was representing, almost solely, the profession in Ireland on the Registration Committee of the R.I.B.A. in London, at very considerable inconvenience and expense.

"The Council of the R.I.A.I. passed a resolution approving of the establishment of Irish examinations for an Irish qualification, to be instituted by them, the representatives of the Ulster Society dissenting, and such dissent was entered on the minutes. This proposal was only dropped because the Council of the R.I.B.A. rejected it.

"It is gratifying to find that the Irish Institute has now come into line with the policy of the Ulster Society in reference to the question of examinations.

"Your statement that Mr. McDonnell wrote you 'courteously declining' to allow his name to be put forward for the Fellowship of the R.I.A.I. is bewildering. I have before me as I write a letter of yours, dated February 14th, 1906, addressed to our present president, J. J. McDonnell, J.P., requesting him to allow his name to be placed on the list for election to Fellowship of the R.I.A.I., to which he replied on the 10th February, 1906, as follows:—

I am obliged for your letter of 14th inst., inviting me to allow my name to be included in the list for ballot for Fellowship of the Institute—a request to which I accede.

"To which you replied under date, February 20th, as follows:—

Thank you for your letter of the 19th. I am very glad you will allow your name to be put on our list.

"Mr. McDonnell's name was put on the ballot paper which was sent out to the members, and his name was rejected.

"Might I remind you that apart from their connection with the Ulster Society of Architects, as ex-President and President respectively, Mr. Gilliland and Mr. McDonnell have been for many years, and are still, members of the R.I.A.I., and have sat also for several years on its Council as representatives of the Ulster Society of Architects, and as such surely merit some courteous consideration from the Honorary Secretary of the Institute.

"Other questions have arisen from time to time, not referred to in your communication, notably the unfounded charge that the Ulster Society of Architects were reducing fees, and the neglect to give effect to a minute of the Council of the R.I.A.I. on the question of Conditions of Contract, which have caused considerable annoyance to the Council and members of the Ulster Society, but my Council felt that the refusal to elect our president to the Fellowship of the R.I.A.I. was a direct insult to the Society, and indicated that the time had arrived when such an abnormal state of affairs should be terminated."

## TESTING CEMENT.

The importance of testing cement deserves to be more generally known. It certainly is becoming much more widely appreciated, and Messrs. W. and T. Avery, Ltd., of the Soho Foundry, Birmingham, have now placed upon the market a table pattern cement testing machine which effectually registers the strain exercised upon the sample.

The cement is moulded in a section one-inch square and gripped in horse-shoe holders, one of which is attached to the straining screw, and the other is connected to the lever. A hand-wheel upon the straining screw draws the specimen taut in the grips and places the steelyard horizontal. Shot is then admitted into the can at the end of the steelyard until the specimen breaks.

The steelyard in falling strikes a trigger arrangement, which operates upon a sluice and cuts off the supply of shot.

The can containing the shot is then suspended from the shackle at the outer end of the lever, and its weight ascertained by the movement of a poise on the steelyard, and loose weights added to the counter poise. The readings on the steelyard give the exact strain at which the specimen broke.

The machine is finished in the best possible style, the graduations on the steelyard being all machine divided, ensuring a high degree of accuracy. The material is of the best quality, and is thoroughly tested before being sent out.





**Belfast.**—The foundation stone of Articlave Orange Hall has just been laid. The proposed outlay is about £250.

**Ballybricken.**—The new convent of the Sisters of Mercy was formally opened last week. The foundation stone of the building was laid on 1st of May of last year. The contractor was Mr. John Hearne, of Waterford, and the architect Mr. J. A. Ryan.

**Dublin.**—Mr. M. Glynn, North Brunswick-street, Dublin, is re-building Nos. 10, 11, and 12 North King-street, according to plans and specifications by Mr. J. C. Parker, Elm Grove, Rathmines. Mr. Glynn is also re-building 13, 14, 15, and 16 according to the plans and specifications of Mr. J. F. Bergin, Westmoreland-street, Dublin.

The South Dublin Auxiliary Schools at Pelletstown are now nearing completion. The contractor is Mr. M. Glynn, and the plans and specifications are by Mr. G. P. Sheridan, A.R.I.B.A., 25 Suffolk-street, Dublin.

Mr. E. Warren has just completed a picturesque house at Blackrock, which he intends to reside in. Mr. Edwin Bradbury prepared the plans and specifications. This gentleman has now changed his office to 7 Nassau-street.

Mr. Robert Farquharson, 71 Jones'-road, Dublin is extending and altering 3 shops, viz., 51, 52 and 53 South King-st., for Mrs. Laird, according to the plans and specifications of Mr. J. Hampden Shaw, Westmoreland-street, Dublin.

**Edenderry** (No. 1 Rural District Council).—The above Council will, to-day, receive tenders for completing Block Houses in Edenderry, in accordance with plan and specification of Mr. H. R. Waters, C.E., Edenderry.

**Greystones (Co. Wicklow).**—The new convent in Greystones has been opened. It is situated immediately beside the Catholic church, and commands a beautiful and uninterrupted view of the sea. The structure itself is built entirely of concrete, plastered and lined out in imitation of Ashlar stonework. The inside comprises among other things a very fine schoolroom, ninety-two feet long, by twenty-three feet wide, divided by patent rolling partitions, with a boys' school, girls' school and a classroom. There are also on the ground floor a music room, two reception rooms, community room, and refectory, with kitchen, scullery, and pantries. The building itself is of a quadrangular style, occupying three sides of a square, and being traversed on the three sides by a corridor six feet wide, which is laid with tiles of a very nice pattern, and well-lighted with lofty windows. The upstairs comprise cells and dormitories, infirmary, and a large oratory. The roof of this oratory is open woodwork, supported on principals with panels between. The whole is varnished, and presents a very nice appearance. All the doors and woodwork throughout are of pitch pine, varnished, and present a very bright and cheerful appearance. The building was carried out under the supervision of W. H. Byrne and Son, architects, Suffolk-street, Dublin, and the contractor was Mr. P. J. Kinlen, of Greystones. The time occupied in the building of it was exactly twelve months, and the cost was over £6,000.

**Kilbeggan.**—Tenders were received for the erection of a teacher's residence at Rahugh.

**Kilkenny.**—The drapery premises known as the Monster House, which were burned in January of the present year, have been rebuilt for the proprietor, Mr. Richard Duggan, J.P., by Messrs. Ryan and Sons, of Limerick, from designs of Mr. Fogarty. The new premises, which are an ornament to the city, were opened last week.

**Limerick.**—At the meeting of the Limerick Board of Guardians on Wednesday, Mr. J. Lynch, a member, said the Bishop, Most Rev. Dr. O'Dwyer, was disposed to give a sum of £2,500 towards the erection of a sanatorium for consumptives. The matter was adjourned for further consideration.

**Loughglynn.**—The dedication of the new church, the foundation stone of which was laid in May of last year, will take place on the 14th inst. The church, which is in the Gothic style of architecture, comprises nave, sanctuary, aisles, two sacristies, two porches, and heating chamber.

The total length of the church, including the sanctuary, is 105 feet 3 inches, and the total width across nave and aisles 50 feet; the height to ridge from floor is 53 feet. The ceilings are sheeted, and divided into panels by mouldings of pitch pine. The church was built by Messrs. Courtney and Co., of Belfast, from the designs and under the supervision of Messrs. William H. Byrne and Sons, architects, 20 Suffolk-street, Dublin.

**Mulranny (Co. Mayo).**—A new church was dedicated by his Grace the Archbishop of Tuam on Sunday last. The new church was begun some eighteen months since. The church itself is designed in the Irish-Romanesque style, freely treated. Taken in conjunction with the present revival of interest in matters Irish, this seemed to dictate the idea that this Irish revival should properly have influence in moulding and forming the character of a modern Irish ecclesiastical structure. For this reason, Irish influence is markedly observable in the design of the church of Mulranny. Not alone in the design is the Irish influence marked, but in the structure itself all the materials are Irish. The general walling is of the local stone, quarried by the poor parishioners themselves, in order to reduce the contract. Not alone did they do this work, but also themselves performed the arduous labour of levelling the site. The church is a commodious one, affording ample accommodation for the needs of the parish. It consists of nave, chancel, and sacristy. The total length is 65 feet, and the width across is 25 feet. The nave is spanned by a timber barrel vault, which will be stained a malachite green and lightly varnished, the principals being picked out in cream colour for decoration. The general intent of the design is to give scope for decoration should ever the narrow resources of this poor and remote parish admit thereof in the future. The windows are filled with lead lights in Celtic patterns, by Messrs. J. Clarke and Son, North Frederick-street, Dublin. The roofs are covered with small, thick, rough, grey-green slates from the Killaloe quarries. The cement used is from the County Wexford. A feature of the work is the deeply-recessed entrance doorway, in rough hammered stone, and the bold three-light window over, suggested by old Irish work; and the front derives an aspect of solidity and strength from the boldly-battered buttress on either side terminating in semi-circular gablets, the whole having a thoroughly Irish and local character. Practically speaking, no cut stone has been used, save where unavoidable, the rough new quoins of a reddish-tinted stone having a bold and suitable appearance in quoined and door and window arches, contrasting well with the cream-coloured, rough casting with which the walls generally are covered. The walls throughout are three feet thick, the situation being very exposed. The contractor for the church and the small glebe house adjoining is Mr. P. J. Gilmartin, of Ballina, of the excellence of whose work throughout it is impossible to speak too highly. The church and glebe have been built from the designs and under the supervision of Messrs. Doolin, Butler, and Donnelly, of Dublin, architects.

**Monaghan.**—The Joint Committee of the Monaghan Asylum will, on 11th inst., consider tenders for erection of a boundary wall.

**Pomeroy (Co. Tyrone).**—Designs are being prepared by Messrs. Doolin, Butler and Donnelly for a new church here.

**Roscrea.**—The renovation in the line of exterior repairs to the roof and exterior decoration and painting of St. Cronan's Catholic Church have been completed. The former have been skillfully carried out by Mr. Joseph Day, Roscrea, and the latter by Messrs. Quigley and Son, Birr, from designs of the architects, Messrs. Ashlin and Coleman, Dublin.

**Strade (Co. Mayo).**—A new church is proposed to be built here.

**Suncroft.**—The new church is to be dedicated to-morrow (Sunday) by the Bishop of the diocese, Dr. Foley. It is in the Gothic style, comprising nave, sanctuary, side chapel, and two sacristies. The walls, it is pleasing to note, are built with local limestone, and are faced with the same material. The dressings of windows and doors are of Ballyknocken granite, from Mr. Osborne's quarries. The nave will be lighted by six lancet windows, and by a large circular window in front, while the sanctuary, which is apsidal in shape, will be lighted by five lancet windows. The entrance door is deeply moulded with heavy polished granite columns at each side. A richly moulded arch springing from polished granite columns divides the nave from the sanctuary. The roof is supported by richly wrought tresses in carved corbels, and the ceiling is of pitchpine divided into panels by mouldings. The work was carried out by Mr. P. Nolan, contractor, Monaghan, from the plans, and under the supervision of Messrs. H. Byrne and Sons, architects, Suffolk-street, Dublin.

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**Tullamore.**—On the 7th inst., the new church under the title of the Assumption of Our Blessed Lady, will be formally opened. The plan of the church was furnished by Mr. M'Namara, Dublin. From the outside eastern wall to the west door the church measures 172 feet, and consists of nave, 36 feet wide, and side aisles, 18 feet each in width. The sanctuary is a singularly striking and graceful one of apsidal shape, having on either side two ornate chapels—one, on the Gospel side, of the Sacred Heart, behind which is the sacristy for priests and Altar servers, and the other, on the Epistle side, of the Blessed Virgin, behind which is a tribune for the accommodation of the Sisters of Mercy. The vestry and tribune are both veiled off from the High Altar by pitchpine perforated screens. In front of the High Altar the chancel arch presents a noble appearance, and rests on two huge columns supported by a cluster of smaller pillars of polished Galway granite, and spans the whole width of the nave. Over the High Altar, as well as over the side Altars, the groined roof is of fibrous plaster, whilst the roof of the side aisles and the great centre roof over the nave consists of polished pitchpine panels. The clerestory windows of the church and the window on the west end, as well as the windows on the side aisles, are all glazed with cathedral glass, designed by Messrs. Clarke, church decorators, Dublin. Special attention has been paid to heating and ventilation, and an electric plant has been provided for the purpose of supplying the church, interiorly and exteriorly with an up-to-date light. This light is supplied from an engine, dynamo, and set of accumulators just opposite the sacristy, and manipulated from a switchboard. In the west end of the church, on an octagon-shaped gallery, right under the large ornamental rose-window, stands a splendid organ, built by the firm of Telford and Telford, Dublin. In the east end is the High Altar, richly carved and built of Sicilian marble, interspersed with panels of Carrara and shafts of onyx, Cork and Connemara marbles, wrought by the firm of Messrs Malone, of North Strand-road, Dublin. The Stations of the Cross are painted in oil, and inserted into the walls in tastefully decorated frames.

**Waterford.**—On Thursday last week, at noon, the handsome and commodious new Central Technical Institute, situate at Parnell-street, was formally opened in the presence of a large and representative gathering of the citizens. We hope to give an illustration of the new building in our next issue.

**Youghal.**—At the last meeting of the Rural Council, Mr. E. Green, C.E., reported that he would recommend the Council to purchase a site for the proposed free library in Killeagh, which could be built at an approximate cost of £160. The old National Schoolhouse at Gurtroe could be made suitable at a cost of £80, and there was a fair-sized house in the village of Ballymacoda which could be repaired for a sum of £50. After some discussion it was decided to refer the matter to local committees, including the clergy-men, to consult with Mr. Green, and Mr. Green was directed to furnish a report in connection with Inch, where a library already exists.

Mr. Martin Dixon, of 3 Carysfort Road, Dalkey, has in hands, or has lately completed, several contracts, amongst which may be mentioned a number of labourers' cottages for the Shillelagh Rural District Council, Mr. J. J. O. Ramsay, Dunlavin, being the architect. He also lately executed a large main sewer for the Dalkey Urban Council on the Barnhill and Killiney Roads; Mr. Shirley R. Going, Urban District Surveyor. In addition, Mr. Dixon has also recently finished additions and alterations and drainage to Beaufort House.

From time to time Mr. Dixon has carried out works for the Dalkey Council, and amongst these may be mentioned the Dalkey Public Library, the new Granolithic footpaths, etc., etc.

## THE PHENIX FIRE-PROOF PARTITION.

What is known as the Phoenix Fire-Proof Partition is a recently-invented method of making concrete slabs for partition walls in buildings and for other purposes, and it is claimed for the new material that it will rapidly supersede all other classes of material used for similar purposes when the public become more familiar with the advantages to be gained by its adoption for partition and other walls, ventilators, etc. Although the making of slabs by this process was originally invented in Holland, for some years past the slabs have also been made in England, and extensively used in new buildings both in that country and in Scotland. The process has now been introduced into Ireland by Messrs. George Rome and Co., of Clanwilliam Place, Dublin, the well-known fibrous plaster contractors, who are the sole agents and manufacturers for this country.

The Phoenix Slab is composed of a mixture of fine pumice-stone, cement, and a small proportion of breeze, the composition of the finished article being solid and uniform throughout.

The characteristics of pumice-stone, which make it specially adaptable for use in making these slabs, are (1) that it is an ideal incombustible material; (2) it has hygienic qualities, and does not favour the harbouring of germs; (3) its extreme lightness. The breeze ensures rapid drying, and the concrete, of course, is the binding agent.

The slabs manufactured in this way absorb very little moisture, and besides do so very slowly, so that when plaster is applied later it has time to thoroughly unite itself to the slab and the joint. Phoenix slabs are made to a standard size of 12 inches by 36 inches, the thickness varying from  $1\frac{1}{4}$  inches to 4 inches, according to the purpose for which they are required. The edges of the slabs are tongued and grooved. After being manufactured, the slabs are allowed to mature for some weeks, so that before being sent out for use they have time to form a dry, hard, and petrified mass, and are suitable for either indoor or outdoor use. The method of making a partition or other wall is simply to build up the slabs on edge, using a grouting of cement to hold them together, the tonguing and grooving of the slabs already referred to further guaranteeing the strength and solidity of the wall.

For most ordinary purposes a partition wall made in this way does not need any internal or external support apart from the main walls of the building where it is erected. As regards fire-resisting properties, the material has been tested up to 2,000 degrees Fah.

Further advantages are that the slabs are practically sound-proof and can be easily sawn. Nails can also be driven into them, and will hold almost equal to wood. This is a considerable advantage in such buildings as artisans' dwellings, etc. They can also be finished in plaster, Keen's cement, Portland cement, or any of the patent plasters on the market, no floating coat or wetting of slabs being necessary, and no joints being exposed when completed.

We recently had an opportunity of inspecting a quantity of slabs which Messrs. Rome have manufactured on their premises, and we were impressed with the quality and handiness of the material and its extreme lightness, a 12 inches by 36 inches by 2 inches thick slab only weighing 27 lbs., or about 81 lbs. per square yard. Mr. Malcolm, Messrs. Rome's manager, informed us that for partitions or other purposes the Phoenix slab is cheaper than any other form of material in general use. This fact alone will, no doubt, be one of its strongest recommendations. As already mentioned, the Phoenix partition has been extensively used in England and Scotland during the last few years—some of the buildings throughout which it has been used being the Cosmo Hotel, an eight-storey building in Southampton Row, London; Kensington Palace Mansions, Clarence Gate Mansions, 12-16 Bishopgate Street (offices), Russell Street, Drury Lane, warehouse, factory, and offices; Prudential Assurance (Brighton), and many others.

Messrs. Rome have also started the manufacture of cast concrete blocks, or artificial stone, and already have some samples on view at their works.

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# ENGINEERING SECTION.

## ITEMS.

A comparison between the first and latest Cunard affords an object lesson in the rapid advance of ship-building. In 1840, the pioneer ship was launched, with a tonnage of 1,154, a horse-power of 750, and a speed of  $8\frac{1}{2}$  knots. The latest addition to the fleet, the *Mauretania* has a displacement of 43,000 tons, a horse-power of 70,000, and her speed is anticipated to exceed 24 knots in normal weather. It is difficult to imagine the size of this last product of the ship-building yard, exceeding, as she does, her predecessor in the Cunard line by 160 feet. She will be driven by four turbines, while on the centre shafts are two turbines for driving the ship astern. But the speed required to regain the blue ribbon of the Atlantic, and to comply with the demands of the Admiralty in time of war, when she will be utilised as a cruiser, will be obtained at a high price. It is estimated that 1,000 tons of coal per day will be consumed when she is driven at her maximum speed!

The report of the Board of Trade Inspector, on the regrettable disaster at Salisbury, proves but a confirmation of general expectation. The accident was, undoubtedly, caused by excessive speed, while rounding a sharp curve, the rate being estimated at between sixty to seventy miles an hour, or double that of the company's regulations. The engine driver, who was responsible for this dereliction of duty, is beyond the reach of censure, but the guard of the train received sharp criticism for not applying brakes when he realised that the allowable limit was being exceeded. We cannot, however, help thinking, that for the guard to apply brakes, without a call for same, would give rise to much graver reprimand, and with more reason, if a subsequent accident ensued, and it is highly probable that the alternatives were in his mind during the few moments allowed to him in which to decide, as it happened, wrongly. A regulation on this subject will be required at once, after such an unexpected expression of opinion on the part of the Inspector.

Mr. Harry Hems, a frequent contributor to our columns, has published some notes in the *Building News*, on a visit he is paying to New York. He is not apparently struck with the courtesy of the American engineer. In an endeavour to obtain information about the huge terminus of the Pennsylvania, New York and Long Island Railway Company, which is being erected in the midst of the city, the Resident Engineer curtly informed him he was not permitted to give any information with regard to it. English architects and engineers, travelling in the States, often experience similar rebuffs, a different treatment to that meted out to visitors to the large building works on this side of the Atlantic, where, on the production of a card to the architect, the greatest trouble is taken to point out all that may be of interest. Mr. Hems states—"There is much to admire in the energy and 'go' of the inhabitants of New York; but, especially amongst its operatives—like the man we have read of in the Bible—there is one thing they distinctly lack—good manners!"

During the next Parliamentary session, it is quite possible that a new tunnel scheme, for connecting Ireland and Great Britain, will be laid before the House of Commons. The idea is, of course, anything but a novelty, but even the cross-Channel fliers, which have within late years been built for service between Holyhead, Fishguard, and this country, reducing the sea passage to under three hours, still leave something to be desired by the travelling public, which prefers a more reliable means of transit than the uncertainty of the Irish sea. The chief obstacle to the construction of a tunnel between Stranraer and Larne has been a deep chasm in the ocean bed, known as Beaufortsydke. It has now been found practicable to skirt this cavity, by boring in a slightly different direction, at a cost of ten millions. The work is expected to take ten years to complete. The tunnel is only a portion of a plan to inaugurate a fast rail route to the East by a new railway across Ireland to Blackrock Bay, and thence, by a line of steamers, to the nearest port of call in Canada. The very magnitude of the proposals may well lead to the hope that passengers from Dublin, in the comparatively near future, will be able to journey to London by rail, without even the inconvenience of a change of carriages.

It is seldom that the horrors of a railway accident in the United Kingdom are intensified by an outbreak of fire, which materially hinders the work of rescue, and may add to the death-roll of the victims in a manner at which one shudders to think. Such conflagrations are a common feature of American disasters, but the recent smash at Grant-ham has struck nearer home. For this reason it may be anticipated that Board of Trade regulations, as to the construction of the rolling stock and the lighting of the carriages, will be framed in a stringent manner. There is little question that gas, as an illuminant, is a considerable source of danger, and that its use should be entirely abolished. It is not such a wonderful improvement on the old-fashioned oil lamp, itself even less dangerous, and a fractured pipe, once ablaze, can quickly convert wreckage into a furnace. Even at the risk of a decrease in dividends, it should be compulsory for the companies to sufficiently light their carriages with electricity; the present deficient and risky methods employed by many lines are a disgrace which should not be tolerated. The amount of combustible material, of which carriages are composed, is another evidence of the *laissez faire* policy of the railway companies. We fear that on neither of these matters will those responsible amend their methods, until forced to by Parliament or the Board of Trade.

At last Dublin citizens may congratulate themselves that the main drainage system is opened. Since the initiation of the scheme in 1892, the Corporation has had to withstand much sharp criticism, some, perhaps, justifiable, but the greater part of it instigated by that almost universal opinion, that everything undertaken by a public body must *ipso facto* be a failure. The two most serious events in the history of this huge sanitary undertaking were the report of some Corporation officials upon the improper quality of the work, which gave rise to much alarm, and the action taken by Messrs. S. Pearson and Son for a large sum of extras connected with the outfall works. Both these storms were safely weathered. Sir Alexander Binnie, at the request of the Corporation, made a careful survey of the system, and stated that both material and execution were of an unusually high standard. In two actions the Corporation won the day against Messrs. Pearson and Son. The congratulations offered by the guests at the inaugural luncheon were well deserved, and we are confident are echoed by the whole of the citizens of Dublin. The scheme was boldly planned, and consists of a system of sewers along the North and South Quays of the Liffey, which will intercept the sewage formerly discharging direct into the river. The northern sewer, by means of a siphon from Eden Quay to Burgh Quay, joins the southern sewer, and then passes along under the southern quays to the outfall works at the Pigeon House, the foundation-stone of which was laid by the Lady Mayoress, wife of Sir Thomas D. Pile, Bart., on May 28, 1900. The total length of sewer is  $7\frac{1}{2}$  miles, and the cost of the work will exceed £600,000. After precipitation treatment at the outfall works, the sludge will be conveyed to sea by a new Corporation steamer, the *Shamrock*, which was designed and constructed in Dublin. The system was designed by Mr. George Chatterton, and the contractors for the drainage proper were Messrs. H. and J. Martin, Limited, Belfast and Dublin. Steps are already being taken to close the old evil-smelling outfalls to the river, and, before long, the sewers will be doing the whole of the work for which they are intended. By the inauguration of the system two time-worn sources of wit and humour will be lost to the journalist and the song writer—we refer to the odours from the Liffey, and the weather-beaten Corporation barge, the *Eblana*. To them, with such a void created in their repertoire, the ill-bred clowning of certain guests, on the opening day, must have come as a veritable god-send. No sooner has the Corporation completed one vast engineering work than, like *Oliver Twist*, it asks for more. To prevent fear of future water famine, an extensive additional storage reservoir is to be formed at Roundwood. The estimated cost is £134,842. The present storage capacity is 2,400 million gallons, equal to a daily supply of 12 million gallons. The new reservoir will be about 2 $\frac{1}{4}$  miles long by nearly two-thirds of a mile wide, and will have a storage capacity of 1,250 million gallons. When the scheme is completed the whole reservoir will give Dublin a storage of six months' water supply, ample for the most pressing needs.



## OPENING OF THE DUBLIN MAIN DRAINAGE.

The great and notable work of the main drainage of Dublin was brought to a formal conclusion the other day, the occasion being celebrated by a luncheon given at the Pigeon House Works. The circumstances which led up to this great undertaking are so well known that it is needless to here enter upon them in any great detail. Suffice it to say, that the question was in contemplation fully half-a-century ago. Fifty or sixty years ago the Liffey was a comparatively pure and limpid stream. The introduction of the Vartry water supply, together with the persistent efforts of the Corporation to suppress the old privy or midden system within the city, and the consequent general spread of the water-carriage system of sewage disposal, resulted in the Liffey becoming fouler and fouler, and although it was alleged, and apparently proved, by medical experts that the residents on the immediate banks of the Liffey were amongst the most favoured of the citizens in regard to the enjoyment of good health, and immunity from zymotic disease, a possible explanation of which may be that the wider breadth of space from house to house on opposite sides encouraged a continuous current of air, while the ebb and flow of the tides, which are tolerably well marked in the Liffey, prevented the Liffey from becoming a culture ground for the bacilli of typhoid and like diseases.

### A Retrospect.

Quite a considerable number of years have elapsed since the late Mr. Parke Neville, then City Engineer, in conjunction with Sir Joseph Bazalgette (who designed the London main drainage scheme), drew up plans for the main drainage of Dublin, but the project, on account of the large outlay involved, never got beyond the initial stages, though attempts were from time to time made to revive it. Things thus went on from year to year, the condition of the Liffey growing more and more offensive. Early in the "eighties," it will be within the memory of most of our readers, what may be called "the Dublin typhoid controversy" began, and continued for at least a dozen years, during which period many theories were propounded, and several persons made reputations as sanitarians. Every autumn Dublin was visited with a scourging epidemic of typhoid, and, despite every effort, no appreciable diminution could be effected on this annually-recurring plague. Some attributed it to the bad drainage of Dublin; these were sub-divided into parties who meant some that the main sewers were defective; others that the faulty domestic drainage of the individual houses was to blame; others said that the disease was attributable to the fact of Dublin being built largely on a swamp or reclaimed ground, that the sub-soil of the city was sewage impregnated, and that it was to the exhalations therefrom that the high zymotic death-rate was due, and pointed to the experience of Trinity College, where there was constant typhoid, until the late Professor Haughton suggested the pumping of the sub-soil and discharge into the city sewers, since when the College has remained tolerably free from typhoid, to which other critics replied that the College authorities were only pumping up the waters of the Liffey, and discharging them back into the river, and so the controversy raged in the newspapers. Some attributed the whole evil to the foul state of the Liffey, while others laughed the suggestion to scorn. Meanwhile the typhoid came with exemplary punctuality every autumn, and left not till it had claimed and received the annual tribute of lives.

Midway and late in the "eighties" the state of things had become very serious. The Royal Barracks was a hot-bed of typhoid. The other barracks were more or less affected, but the order to be quartered at "The Royal" was regarded by officers and men as going right into "the jaws of death," and, indeed, many and many a promising life paid the penalty. The War Office was assailed night after night in the House of Commons, and the present Premier, Sir H. Campbell-Bannerman, then Secretary for War, and his predecessor, Lord Hartington, now Duke of

Devonshire, were utterly at a loss what to do. As usual with the War Office, the matter was "tinkered" at. One expert after another reported, but without result. The first useful contribution towards a remedy was when the Government instructed Mr. T. Rogers Field, of London, the well-known sanitary expert, to report, which he did exhaustively, and arrived at the conclusion that neither the much-abused Liffey, nor yet the main sewerage of the city, had much, if anything at all, to say to the unhealthy state of the barracks, but that from generations of want of cleanliness and lack of elementary sanitary precautions, the floors, the walls, the very mortar, and the fabric itself of large portions of this big barracks were disease impregnated, and the results of chemical and bacteriological examination confirmed this view. When Lord Wolsley came to Ireland as Commander of the Forces, he was shocked at the deadly condition of the Royal Barracks, and his characteristically prompt action nearly brought about a sensational crisis, which he only averted by eating humble pie. Reading the Queen's regulations, Lord Wolsley saw that he was responsible for the health and well-being of the troops in his command, and the War Office, having long neglected to deal with the problem, he took on himself to order the demolition of parts of the barracks, which action resulted as we have described. However, it bore good fruit, and eventually the War Office, through Mr. James P. Pile, as contractor, with Colonel W. C. Dickenson (an old pupil of Sir Thomas Deane and Son), an artillery officer, whose old architectural training stood him in good stead, as immediate supervisor, got to work, and the Royal Barracks were in great measure demolished and re-built, since when there has been little or no typhoid there.

These occurrences helped to focus public attention upon the desirability of a good system of main drainage, and fifteen years ago a committee, with the late Alderman Meade as chairman, began work afresh. On Mr. Spencer Harty's advice, the help of Sir J. Bazalgette was again sought, but he declined the commission, recommending, however, Mr. George Chatterton, M.A., B.E.T.C.D., a son of Vice-Chancellor Chatterton. Mr. Chatterton was Sir Joseph's partner, and, we believe, son-in-law.

The great scheme was finally got into shape under Mr. Chatterton and Mr. Spencer Harty, with Mr. H. H. Hellins as engineer-in-charge, and to the patient energy and unremitting care of the latter gentlemen is largely due the success of the project. The scheme is a very large one, comprising eight miles of main sewer on the North and South sides of the city, a great proportion being at an average depth of 24 feet below the road level. The cost has been over £600,000, and it is to be hoped that this outlay will result in better health in the city, and a pure and brighter Liffey.

Many serious engineering difficulties were met with, notably the syphon under the Liffey connecting the North and South sections, the work under the Dodder, and the generally bad character of ground gone through.

The system of purification adopted having been devised so many years ago, and both knowledge and fashion having since marched so rapidly, there is no doubt but that it is now substantially out of date, bacteriological purification having practically superseded both chemical precipitation and ordinary sewage farm irrigation. At the same time it is difficult to see how bacteriological filtration, with its attendant contact beds or continuous filters, could be arranged at the Pigeon House, as, although the Corporation acquired a nominal 60 acres, the actual amount of available space is very much smaller, owing to the site being so covered with buildings. The probability is that the present arrangement is about as good as could be devised under present circumstances. It must be remembered that the whole question of sewage disposal has for the past forty years been in a state of transition. Of course, the introduction of bacterial methods some years ago marked a very substantial progress.

We abstract the following general description of the

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scheme from the *Irish Times*, as it is admirably clear, and can hardly be improved upon:—

#### Details of Plans.

These plans were divided into 13 sections, as follows:—  
 1. Intercepting sewers, south of the Liffey. 2. Intercepting sewers, north of the Liffey. 3. Syphon under the Liffey, opposite Hawkins Street. 4. Main low level sewer from syphon to Ringsend. 5. Engines and pumps. 6. Boilers. 7. Chemical mixing machinery. 8. Engine-house and buildings at Ringsend. 9. Main high level sewer from Ringsend to outfall. 10. Reclamation of site for precipitation tanks. 11. Precipitation tanks and outfall works. 12. Sludge pumping machinery. 13. Sludge vessel. Messrs. H. and J. Martin, Dublin and Belfast, secured the contract for the construction of the intercepting and branch sewers, the syphon across the Liffey, the low level sewer; and Messrs. Pearson and Son, a London firm of contractors, were entrusted with the construction of the outfall works, etc., at the Pigeon House. The latter firm, it will be remembered, took an action against the Corporation in reference to extras which were charged for in connection with the condition of the old harbour wall at the Pigeon House. The Lord Chief Baron decided in favour of the Corporation, and the Court of Appeal upheld his finding, but the case, we understand, is still unsettled, pending the decision of the House of Lords, whose opinion has been sought. Considering the enormous expenditure on the whole scheme, the disputes between the Corporation and their contractors have been very few, and it is also pleasant to be able to state that the number of accidents involved in the carrying out of the work has been comparatively small, the principal exception being the fatal occurrence at Burgh Quay, in which a constable of the Dublin Metropolitan Police and a workman of Messrs. Martin lost their lives.

#### The Northern System.

On the North side of the city the system takes its rise near the Infirmary Road in the shape of a pipe drain, which runs down to Parkgate Street, and thence enters on its course along the Northern Quays. On the South side there are several pipes emptying into the main drain near Island Bridge, one of them, three feet in diameter, carrying off most of the sewage of the Kilmainham district. The course of the sewer is then along the Southern Quays, and *en route* several very large pipes empty into it, notably one running through the Patrick Street district. The upper part of the sewer at Island Bridge was constructed in the river-bed for a length of 600 or 700 feet on a concrete wall in order to avoid the property of the War Department. The extensions in the upper portion of the work involved the running of a pipe along the Camac River, and a cast-iron syphon under the Grand Canal and the Midland Railway at Newcomen Bridge, on the North Strand Road. One of the tunnels was driven through the hard boulder clay at Bow Bridge, Kilmainham, and another was made through the limestone rock under the hill at Christ Church Place and Patrick Street.

#### Connection Below the River.

When the two intercepting sewers had been brought, that on the North side to a point near Marlborough Street, from which an extension runs out in the direction of Clontarf, and that on the South side to Burgh Quay, opposite Hawkins Street, they were connected by the syphon constructed underneath the river. This proved a most difficult piece of work owing to the depth of boring required, and also the yielding character of the sub-soil. An enormous amount of tunnelling work had to be done, and excavations made to a depth of 50 or 60 feet. Eventually, however, the difficulties inherent in any work of the sort were successfully overcome, and it must have been with a sigh of relief that the contractors were at length able to complete the junction of the two sewers. From Hawkins Street the sewer runs *via* Great Brunswick Street in a fairly straight line to the Grand Canal Basin. Here another tunnel had to be made, and it also became necessary to bore underneath the bed of the River Dodder. Throughout this stretch of the work the sub-soil proved so treacherous that the ingenious mechanical appliance known as "the Greadhead

Shield had to be utilised. This necessitated the use of compressed air, which was constantly pumped into the sewer at an enormous pressure to the square inch. The results obtained were very satisfactory, although the system involved considerable trouble. The men obliged to work in the tunnel, which was filled all the time with compressed air, had to be periodically examined by doctors, whose duty it was to see that their health did not suffer by the trying circumstances under which they had to work. While this portion of the scheme was in progress the writer paid a visit to the tunnel, entering it at Ringsend pumping station, and travelling up some distance in the direction of the city.

#### In the Tunnel.

The experience was a most interesting one. Accompanied by Mr. Harry Martin and Mr. McCabe, C.E., the visitor was first obliged to descend a long ladder to gain the entrance to the tunnel. All three were then shut up in a tiny chamber, which was gradually filled with compressed air. In this way a person coming out of the natural atmosphere is prepared for a short or long stay in the wholly different and unnatural atmosphere which prevails in the tunnel. A sustained, tremendous pressure on the ears, all the more trying because resulting from some unseen, unheard, impalpable agency, was the first, and, indeed, only, sensation experienced throughout the visit. Relief could only be obtained by closing the nostrils and vigorously withholding the breath. After this had been performed about a dozen times, and after the required pressure was obtained, the door leading into the tunnel opened automatically, and the journey citywards was begun. This portion of the tunnel is eight feet in diameter, and personal observation leads one to believe that it is a really superb piece of workmanship. After an underground walk of a mile or so, it was undeniably a very pleasant sensation to be placed once more in the little chamber already mentioned, and subjected to the process of gradually reducing the aid pressure to its natural proportions. The air within the chamber having been sufficiently lowered in density by allowing it to escape, the door leading out into the sunshine automatically opened, leaving at least one of the trio under the impression that in every respect a little compressed air, in the words of the music-hall song, "goes a very long way." This personal reminiscence will, perhaps, serve to show under what difficulties Messrs. Martin's staff had to work. All persons, no matter how often they entered the tunnel, had to undergo the same process each time, and only those in sound health were able to carry on work under the unnatural conditions which prevailed in it.

#### Ringsend Pumping Station.

A huge chimney stack is one of the striking features in the buildings forming the pumping station at Ringsend. The sewage will be conveyed to the station along the low level sewer from Hawkins Street, and then pumped into the high level sewer running from Ringsend to the outfall. At the station there are four very powerful pumping machines, capable of lifting fifteen million gallons to a height of 23 feet, and it is arranged that one of them shall always be kept in reserve. Four boilers of the latest pattern will supply all the steam required. The pumps have a working capacity of over forty-six million gallons per day, equal to over 5,000 cubic feet per minute, but if the stand-by plant is also utilised; 62,214,000 gallons per day, or 6,912 cubic feet per minute, could be dealt with. The precipitation tanks are at the Pigeon House Fort, and cover an area of roughly 1,000 feet by 100. They are so constructed that the sludge will be easily and readily swept into a central culvert, running through the tanks. The sludge, after chemical treatment, will then be pumped into the high level receptacle at the water's edge, from which it will be delivered into a special barge, named "The Shamrock," for conveyance to the deposit area at sea, a point located six miles east of the Bailey Lighthouse. This distance has been insisted on by the Dublin Port and Docks Board, in order to prevent the sludge being caught by the tide coming up the Liffey. The liquid sewage will also be chemically dealt with at the precipitation tanks, and discharged through the outfall works into the Channel.



## ARCHITECTS AND MODERN CONSTRUCTION.

The evolutionary changes in methods of construction, during the last few decades, have possibly never before been equalled in a similar period. The primary causes were undoubtedly the introduction of cast-iron for beams and pillars, and, subsequently, the use of steel for guides and stanchions, and the adoption of cement concrete as a building material. A secondary cause was the growth of labour unions, which have hastened the use of the new materials. The unfortunate levelling down system, by which these unions apparently hope to benefit their members, has made building operations expensive and tedious. Consequently the materials which can be utilised either in the readiest or cheapest manner have commended themselves to the architect and engineer, and to their clients. The transition received further impetus from America, where the congested condition of the chief cities, the value of the land, and the comparative freedom from restriction under building by-laws, have evolved the "skyscraper," in which steel construction is essential.

For a considerable period after its introduction, steel was merely substituted for the timber beam and cast-iron column, and with but a superficial knowledge of stresses and strengths, aided by the copious data issued broadcast by manufacturers, architects have generally been able to minutely detail their designs. We say generally, for it is a practice with some firms to hand over the plans of their larger buildings to a steel manufacturer, which often tends to satisfactory and economical results.

The modern methods of construction, however, bid fair to undermine the position of the architect unless the profession, as a body, rises to the occasion and deals with the new conditions as they arise.

The danger from fire of exposed steel work in large buildings, and the lack of tensile strength in concrete, has led to a combination of these materials, under the name of reinforced concrete, which is now engaging so much attention from the architectural and engineering professions and in the technical press. In America and on the Continent the allied professions are far more advanced in their knowledge of the qualities of the new construction. This is largely due to the innate conservatism in Great Britain, and the slowness of building authorities to recognise the signs and requirements of evolution. This has been clearly evidenced in England, where buildings, many storeys in height, have been erected on the steel-framed principle, each storey independent of the one below, except for the continuous column. Yet the masonry, on the ground floor, has had to comply in thickness with the same requirements as if it had to support the whole of the superstructure. The steel is looked on practically as a negligible quantity. In New York, Chicago, and other American cities, and in Frankfurt, Dusseldorf, Dresden, Hamburg, and other Continental municipalities, the building regulations have long since been revised to suit the new requirements, and the result can readily be perceived. Even in the United Kingdom, however, the wonderful achievements of reinforced concrete can no longer be overlooked, and, as its use spreads, and more definite knowledge is obtained from the investigations now being conducted, the present by-laws will have to be amended. Then we may expect its adoption generally through the country, and architects will have to face the problems which its use will involve. Will they do this, or will they leave the construction of their buildings in the hands of the patentees of this or that system? Already the tendency is for architecture to develop into engineering.

The methods of heating by open fires, ventilating only by windows and joinery defects, and gas lighting by the flat flame burner, are rapidly passing away from us. Systems of hot air, hot water and steam heating, and schemes of ventilation by propulsion, extraction, natural and artificial, arise day after day, some doomed to early death, others to linger for a while, and a few, a very few, to stay. The intricacies of electric lighting and power, the necessity in large buildings for intercommunication by lift and telephone, and the rapid developments of sanitary science, both with regard to sewage carriage and disposal,

all these make calls upon the brain and the time of the architect, of which the profession knew little a generation ago. And, as most of these branches of building are comparatively in their infancy, it follows that further rapid evolution occurs and may be expected. Can the architect cope with all this additional work and worry, and carry out at the same time his real duties of designing and superintending the construction of the building proper? A genius might, but even architects are not all geniuses. Therefore it follows he must transfer some of these special works to expert firms, and, to a certain extent, such action tends to lower the architect's status; he is left in a large measure in the hands of those to whom he should give instruction. Until now, however, the architect has kept the design and construction of the building itself under his immediate control. With a general adoption of patented systems of ferro-concrete for building purposes, will he still be able to do so? Certainly not, unless the construction is standardised and reliable data are forthcoming. To obtain such a commission is essential, also to safeguard the public, and every architect should be willing to put his hand in his pocket to aid in its formation and the expense of its investigation. It is to be feared, unless such a course be followed, that this new method of construction, with all the possibilities of its effect on design—even to the evolution of a new style—will pass out of his hands into those of the engineer or contractor. Instead of being a "master builder" in the true mediæval sense, the architect may degenerate by easy stages into a glorified clerk of works, with but a nodding acquaintance with the many problems with which the profession to-day is continually faced.

## HIGH-CLASS SEWERAGE.

So far as house drainage is concerned, there are few municipal authorities as strict as those in Dublin, and in connection with this subject it is interesting to recall the causes that led up to this happy state of affairs. It is only about thirty years ago that a general system of drainage was introduced into Dublin. Previous to that time the average Dublin dwellinghouse was most ineffectively drained, and typhoid and other epidemics were of frequent recurrence. This unhealthy state of the city called for a closer study of the question of the drainage of dwelling-houses by the city authorities and architects generally, with the result that for some years past what are known as "Extra Glazed Sewer Pipes" are almost exclusively specified and used for drainage work. This class of sewer pipe is, we believe, only manufactured by a few firms in Scotland. In the process of manufacture a special form of glass glazing is poured over the inside of the pipe. A pipe made from a good, finely-ground fireclay and lined in this manner will neither leak or allow gas to escape. This form of sewer pipe is, of course, quite distinct from what is known as "Ordinary" or "Scotch-Glazed," which are burned in kilns in the usual way, the glazing being done with common salt, which permeates through the kiln and glazes the pipes during burning. This class of pipe is not now recommended by leading authorities for sewers, but is largely used in connection with rain-water drainage. One of the leading makers of "Extra Glazed Pipes" on the market is that manufactured by Messrs. Charles Buicks and Sons, of Alloa, N.B. This firm's pipes are exceptionally heavy, made from a very vitreous fireclay, are straight, true in section, with deep faucets, and lined with a specially thick glass glazing, the glaze being carried half way up the inside of the faucet. Amongst some recent important contracts on which this make of pipe has been used may be mentioned: 110 artisans' dwellings at Inchicore (Oblate site), built by Mr. J. Navagh, for the Dublin Corporation; artisans' dwellings at Kingstown, Bray, Clontarf, etc., etc. Mr. C. P. Glorney, of 31 Poolbeg Street and 11 Moss Street, Dublin, is Messrs. Buicks' sole agent. He carries a large stock of their pipes and usual Dublin sanitary specialities, besides various builders' specialities—fireclay, sanitary, and other goods.

## THE UTILIZATION OF WATER-POWER.

## Big Scottish Scheme.

Some time ago Messrs. The British Aluminium Co., Ltd., having obtained the necessary Parliamentary authority to utilise the waters of the West Highlands for mechanical purposes, placed a contract for the erection of new works, village, etc., at Kinlochleven, on the borders of Inverness and Argyshire, with Messrs. McLaughlin and Harvey, Ltd., of Belfast, Dublin, and London, and we have pleasure in giving below particulars of this very extensive and important scheme. The same firm are also engaged in making very large additions to the company's works at Larne Harbour, where the alumina is extracted from the ore. The architects for both these schemes are Messrs. W. J. Morley and Son, of Bradford and London. The work at Larne Harbour is being carried out under the direction of Mr. Jas. Sutherland, managing engineer.

In order to obtain aluminium a heat is required greater than can be got from an ordinary furnace, and these degrees of heat are readily obtained from electric furnaces. Electricity is, of course, so far as this country is concerned, generally produced by steam-power, and, granted cheap coal, the cost is not excessive; but where the works necessary for utilising water-power can be constructed at a moderate cost, the expense of producing electricity by this means may be very much less than the cheapest steam-power.

The scheme presently being carried into effect at Kinlochleven comprises all the elements requisite for the supply of cheap water-power. The catchment basin has an area of 55 square miles, and it is probably safe to say that the rainfall in this district, reaching, as it does, an average of nearly 100 inches per annum, is the largest in the British Isles. Right in the heart of this basin there is a site for a reservoir at an elevation of 1,000 feet above sea level, and distant only five miles therefrom, this in itself being an important factor, as all dues, with the possible exception of those for lights, will be obviated.

The chief features consist of the reservoir already referred to, a high-level conduit, a pipe track, and the power-house. The reservoir will be about  $7\frac{1}{2}$  miles in length, with an average width of over half a mile, and when completed will probably have the largest capacity of any artificial reservoir in Europe. It will obliterate three small lakes, or lochans, bearing Gaelic names, and its approximate capacity will be about 20,000 million gallons. The company, of course, will obtain an adequate flow of water as a result of the excessive rainfall, the reservoir being necessary to avoid the waste of flood waters. The dam will be formed of concrete masonry, and will be over half a mile long. Its height at the highest point in the centre will be about 80 feet.

From here the water will be led through a concrete conduit along the hill-face for a distance of about three and a half miles, following the natural contour of the ground to the head of the pipe line. The conduit will be 8 feet square, built entirely of reinforced concrete, and roofed over with slabs of the same material. Ample arrangements are provided for regulating the flow into the conduit, and the passage of the water will be controlled by valves of large size. The total fall in the conduit from its commencement to the head of the pipe track is about 20 feet. At this latter point the water is discharged into a Penstock chamber, where are located the valves which supply the water to the pipe track. From this chamber the water will be led to the power-house by means of half a dozen steel pipes, having a diameter of 39 inches. The pipe track, which is about a mile and a quarter long, is supplied with all the necessary controlling and regulating valves, and water will be delivered to the turbines at the power-house under a head of over 900 feet.

The power-house will be of large size, and supplied with all necessary workshops, stores, etc. Here will be placed the turbines for driving the dynamos. These will be eight or more in number, and each will feed its own series of furnaces.

A short distance west of the site of the power-house, and adjoining the head of Loch Leven, is situated the site for

the model village for the accommodation of their employees. In addition to two hundred dwelling houses, there will be the necessary shops, a church, post office, school, hospital, etc., so that in the course of a year or two this at present somewhat inaccessible region of the West will be occupied by a fairly numerous industrial community.

With a view to expediting the transport of the necessary plant and materials, the contractors have erected an aerial ropeway between their wharf on Loch Leven and the dam, a distance of five miles, or thereabouts. This handy mode of transit is now in working order, and it is intended to transport the bulk of the materials to their respective destinations in this manner. For the conveyance of heavy machinery, an overland route has also been laid down throughout, steep portions being worked by wire-winding winches.

The power for the ropeway, and also the electric current for the working of cranes, drills, etc., is supplied by a small temporary power scheme possessing features resembling very much those of the parent project. Power is obtained from the falls on the Leven River. There is a conduit of about a mile in length, with a pipe line and two turbines, the whole being capable of developing nearly 1,000 horsepower. The current, after being generated at the power-house, is fed to the dam by eight copper cables, being thereafter distributed to the various machines employed in the undertaking.

The survey and other preliminary works were commenced some eighteen months ago, and since then the thousand and one details inseparable from a contract of this size have not been neglected. A regular colony of wooden structures, consisting of workmen's huts, workshops, offices, and stores, has sprung into existence.

At Kinlochleven the contractors have erected a comfortable mission hall for their employees, the building being also used as a school and reading-room. To facilitate working, the contractors have connected their different centres of operation by telephone, and in a district minus thoroughfares such an auxiliary is almost indispensable.

All plant, materials, stores, etc., are landed by steamer at the company's pier at Kinlochleven, and regular daily service of motor launches has now been inaugurated between there and Ballachulich.

The cost of the undertaking will probably exceed half-a-million sterling, and the period of construction is estimated at about three years.

The engineers for the scheme are Messrs. Thomas Meik and Sons, of London and Edinburgh, and the contract for the reservoir, conduit, dam, and pipe track has been let to the firm of Sir John Jackson, Ltd.

## THE ROYAL CANAL.

The following is the history of the Royal Canal, as given by Mr. Tatlow, manager of the Midland Railway Company, the present owners of the canal, in evidence before the Royal Commission on Canals:—The Royal Canal Company was incorporated in 1789. In 1813 it was insolvent, and in that year an Act was passed providing that it should be dissolved, and it ceased to be a corporation, and all matters relating to it were transferred to the Inland Navigation Company, with powers to extend the canal. In 1818 there was an extension to Tarnonbarry, and subsequently another Act was passed, and under that Act another company was formed under the title of the New Railway-Canal Company. When the Midland and Great Western Railway of Ireland Company was created in 1845 the Act passed authorised the purchase of the canal, and it was acquired for the sum of £298,059. The total capital was £335,000, the balance being caused by repairs and extensions. The canal was 96 miles 69½ chains in length. Mullingar and Longford were the only two important places on the canal. In the counties in which the canal had its course—Meath, Kildare, Westmeath, and Longford—the decrease of population had been in a much higher proportion than in the rest of Ireland. At present the canal is hardly used at all, and Mr. Tatlow sees no prospect of any substantial increase of traffic.



## FOXROCK AND DUNDRUM DRAINAGE.

When two big drainage schemes are going on simultaneously in one rural district, it is pretty safe to assume that the Councillors of that district are given plenty of work, and that, consequently, they find their hands pretty full. This is just now the experience of Rathdown No. 1 Rural District Council, whose members are confronted with the difficulties which are sure to be inseparable from the launching of the two large sewerage schemes, one having for its object the drainage of Dundrum, at an estimated cost of £13,000, and the other the sewerage of Foxrock, at a probable expenditure of £6,500. In each case the scheme is only at present in its initial stage, but the Council have already had some experience of the embarrassments that may be expected to meet them at every turn. It is all the more surprising therefore that the members of the Council should have gone out of their way to raise unnecessary difficulties, such, for instance, as passing over the two lowest tenders, and giving the contract to a man whose offer exceeded the lowest by more than £1,400. It is only natural that such a deliberate and wanton waste of public money should have been resented by those who have to find it, and that the Council, seeing this, should have made haste to cancel the contract. But the cancellation came too late to be of any use, for, as our report of last week's meeting of the Council shows, Mr. Kelly, who sent in the lowest tender, finds himself unable, through stress of work, to accept the contract, and the Council had no alternative but to give it to another man, leaving the ratepayers to pay for their representatives' supreme act of folly. The incident is not without its lessons, and if the gentlemen comprising the Council take them to heart, the further working out of the schemes will be unattended by many obstacles which might otherwise annoy them.

The Clerk read the eight tenders sent in for the work after the advertisement appeared. The three lowest tenders were:—£4,779 16s. 9d., Mr. Kelly; £6,199, Messrs. Pemberton and Son; and £6,204 16s. 10d., Mr. Dowd.

## Dundrum Drainage.

Mr. McCarthy, C.E., submitted plans of and estimate for the drainage of Dundrum. His estimate for each length of sewer was as follows:—

Low level sewer	...	...	£2,320
High level sewer	...	...	2,970
Kilmacud road	...	...	390
Sewer along Railway road	...	...	480
Goatstown road	...	...	500
Sydenham road	...	...	310
Drumarton avenue	...	...	70
Churchtown road	...	...	840
Classon's Bridge road	...	...	2,210
Branch at Churchtown road	...	...	80
			£10,170
Purification works	...	...	3,530
Total	...	...	£13,700

Mr. McCarthy said that in his estimate he had considered the likelihood of the erection of new buildings in the district, as well as to take in ultimately the houses in Ballinteer road, Sweetmount avenue, Mowlan avenue, and some distance up the Sandford road. The sewer could also be extended up to Campfield terrace on the Kilmacud road, and to the point marked "E" on the Goatstown road. The estimate included engineering and law expenses, but not the land. If the laundry and the asylum be taken into the proposed system he estimated the following volume would have to be dealt with:—

	Gallons.
2,500 persons at 25 gallons per head per day	62,500
Laundry and Asylum (20,000 each)	40,000
Total	102,500

Three times the above amount would have to be treated on filters, and an additional three times on storm water filters, all over six times could be turned direct into the stream.

## ENGINEERING NEWS.

**Bandon.**—The Rural Council will to-day (Saturday) appoint a clerk of works to superintend the laying of water mains in the town of Bandon.

**Belmullet.**—The Rural District Council invited tenders for certain repairs to the Bangor Water Works, which will be considered to-day (Saturday).

**Ballinrobe.**—The Rural Council will, on the 8th inst., consider tenders for the following works in the town of Ballinrobe, in accordance with specifications prepared by Mr. John Ritchie, C.E.—(1) Cleaning sewerage tank and sewers in Abbey-street; (2) constructing main pipe sewer in Glebe-street.

**Templemore.**—Mr. John Walsh, Thurles, has been appointed town surveyor.

The Indian Government have appointed H. V. Shirley Dillon, Esq., B.A. I., son of James Dillon, M. Inst. C.E., of Stratford, Glenageary, to the United Provinces of India, as Assistant Engineer on the Permanent Staff of the Public Works Department.

Messrs. Vulcanite, Ltd., of Laganvale, Belfast, inform us that their Patent Vulcanite Roofing is being used in connection with the following important building contracts:—New factory in Pitt-street, Dublin, for Argyls, Ltd.; architect, Mr. F. W. Higginbotham, T.C.; builder, Mr. George Scott. Messrs. R. and J. Wilson's new bakery at Fleming's-place, Dublin; Mr. A. Mathers, builder. Messrs. Lee's new drapery warehouse in Kingstown; Messrs. J. and R. Thompson, of Belfast and Dublin, builders. Messrs. Todd, Burns and Co.'s new premises in Mary-street, Dublin; architects, Messrs. W. M. Mitchell and Sons, Stephen's Green, Dublin; Messrs. H. and J. Martin, contractors (over 30,000 ft. super. of "Vulcanite" will be used on this contract). Messrs. Wallis' new stables and stores, Belfast; Mr. J. Hogg, builder. The Laharna Hotel, Larne; Mr. J. Ferris, builder. Roofing of Westport House for Marquis of Sligo, and also Messrs. Jacobs' (of Dublin) new biscuit, etc., warehouse, at Manchester, on which 9,000 feet super. of "Vulcanite" is being used. The company has also recently covered a new addition of Messrs. Rickitt and Sons' premises, Kingstown Works, Hull, with Patent Vulcanite Roofing, the roof being used as an outdoor gymnasium, and have lined a large tank for the Belfast Corporation, at their Mountpottinger tramway depot. They are covering the whole of the roofs of the new extensions for the Midland Railway Company at their hotels at Portrush, Larne, and Belfast, with their Patent Vulcanite roofing, finished with macadam. The roofs are to be laid out as gardens. It may be noted that their best quality "Dampcourse" was used in the whole of the foundation work in the new City Hall, Belfast, and also in the foundation work of the new Technical Institute, Belfast.

## CONTRACTS.

## NOTICE TO BUILDERS.

Tenders are invited from competent builders for the erection and completion of a **New Parish Church at Timoleague, Co. Cork**, according to the plans and specifications prepared by M. A. Hennessy, Architect, 74 South Mall, Cork.

Copies of the plans and specifications, and general conditions of the contract, may be seen daily at the Parochial House, Timoleague, or at the offices of the architect, South Mall, Cork.

Copies of the quantities can be had on application to the architect on payment of three guineas, which will be returned on receipt of a bona fide tender.

The lowest or any tender will not necessarily be accepted. Sealed tenders to be addressed to the undersigned on or before the 30th of October, 1906.

REV. PETER HILL, P.P.,

Timoleague.

October 6th, 1906.

P.S.—Timoleague is connected with Cork by rail; and by rail and road (about 2 miles) with the seaport of Courtmacsherry.

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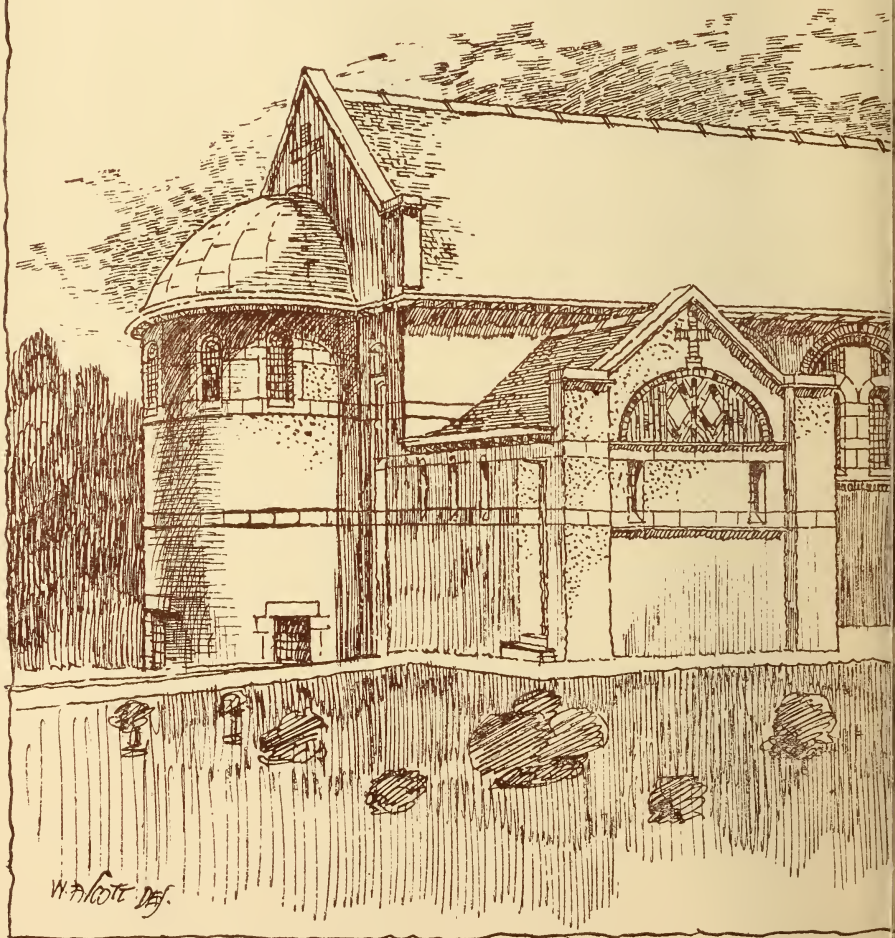
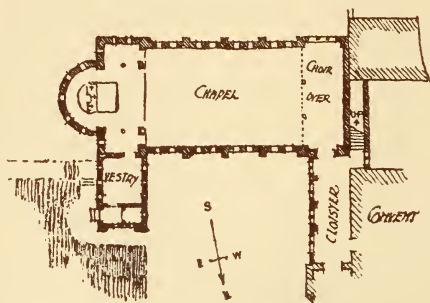


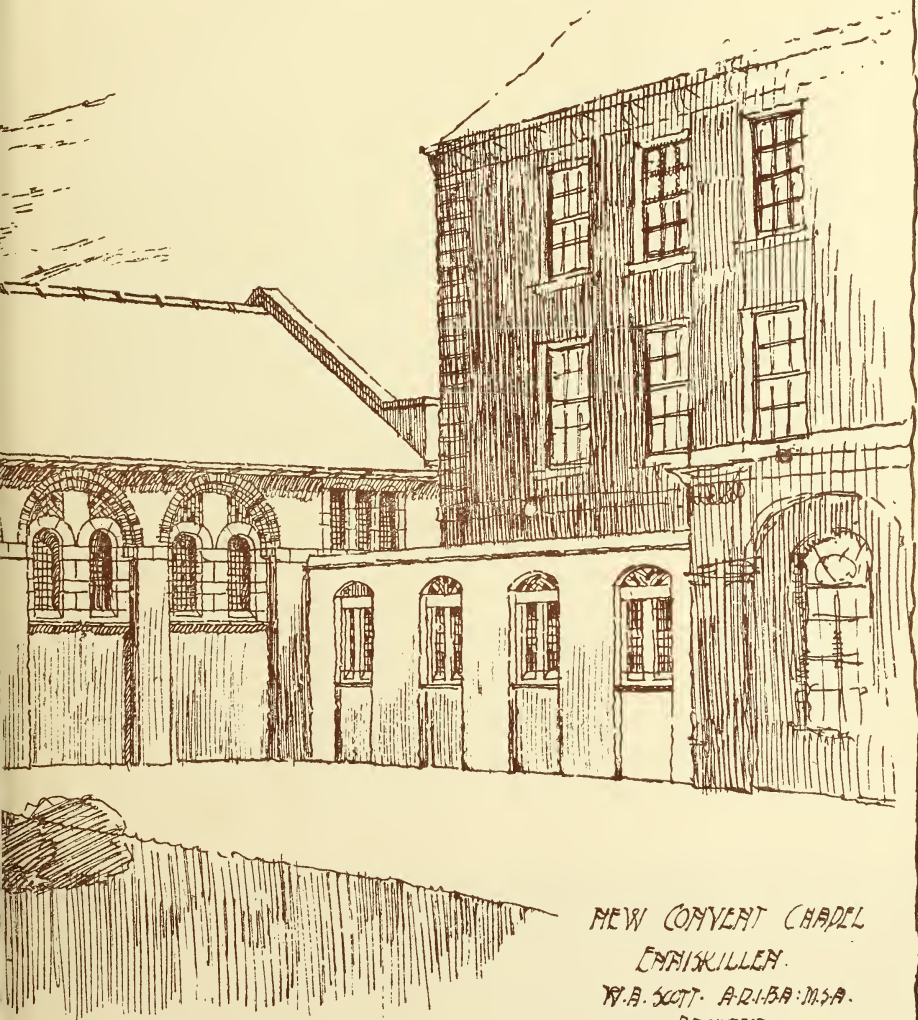
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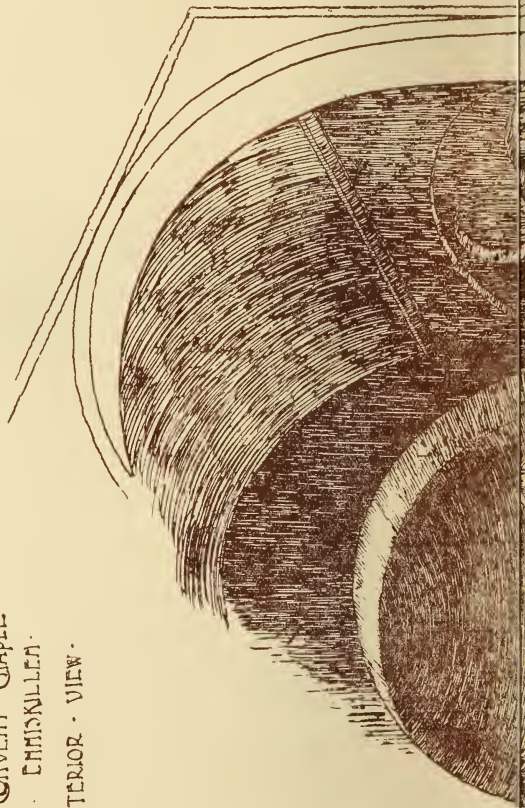
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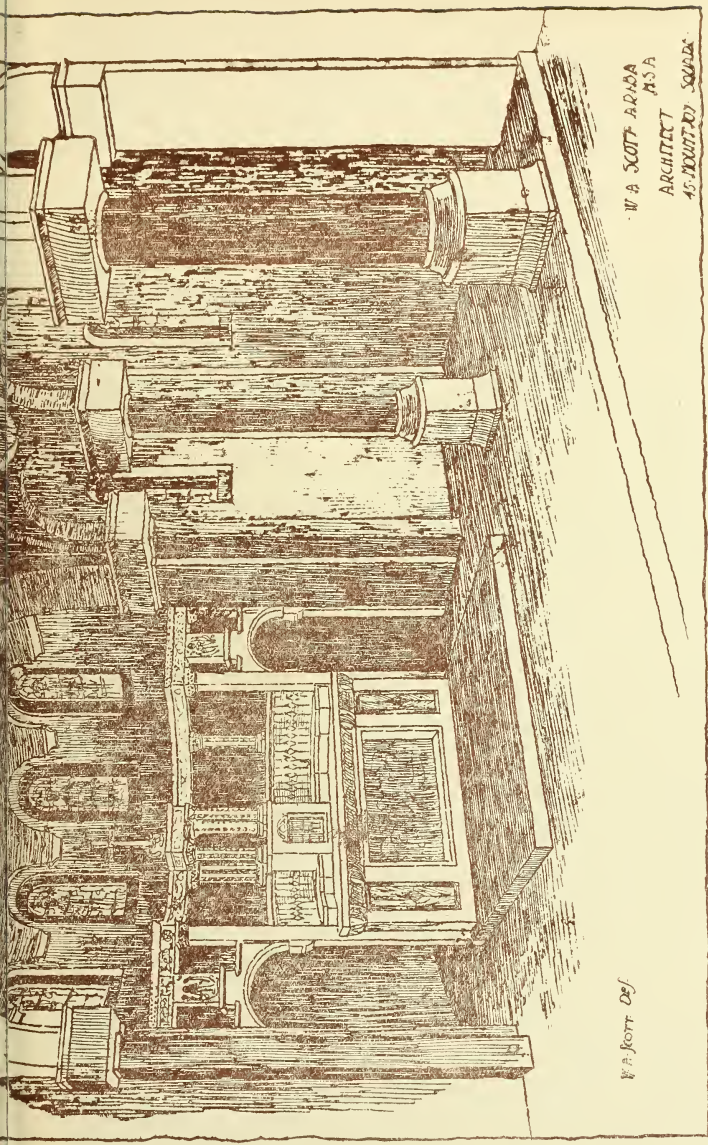
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Supplement to the "Irish Builder," October 6, 1906.

· NEW · CONVENT · CHAPEL ·  
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W.A. Scott Des.

W.A. SCOTT ARCHT.  
MSA  
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45 MOUNTAIN SQUARE



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# THE IRISH BUILDER AND ENGINEER.

A JOURNAL DEVOTED TO

ARCHITECTURE, ARCHÆOLOGY, ENGINEERING, SANITATION,

ARTS AND HANDICRAFTS.

Every Second Saturday.

[Established Jan. 1859.]

No. 21—Vol. XLVIII.

HEAD OFFICE

OCTOBER 20, 1906.

34 LOWER ABBEY ST.,  
DUBLIN

Price 1d.

## TOPICAL TOUCHES.

Mr. Richard Montgomery, B.E., has been elected to the vacancy in the Engineers' Department of the Pembroke Urban Council.

\* \* \* \*

We hear that the London Architectural Association has no less than 500 unemployed assistants upon its register of those seeking engagements. This speaks volumes as to the terribly slack state of business amongst architects. The revival of business generally, however, continues, and the architectural profession is, to a small extent at all events, favourably affected.

\* \* \* \*

Two important contracts are just now open for tendering—namely, the Howth Sewerage Works, with septic and storage tanks near the railway station, and the Howth Water Supply Scheme, with the necessary reservoirs, etc.

\* \* \* \*

Mr. P. H. MacCarthy, M.I.C.E.I., is the engineer for the former scheme, and Messrs. Massard, Tyrell, Kaye-Parry and Ross for the latter.

\* \* \* \*

The tenders must be lodged by 13th November. The Council have introduced conditions, stipulating that all materials used in the carrying out of the works shall be of Irish, and, if possible, Dublin make, unless the engineer having charge of the works shall be of opinion and shall satisfy the District Council that such materials cannot be procured in Ireland. The contractors must also provide that all labour employed in the carrying out of the works shall be Dublin, and, as far as possible, local labour, unless the engineer shall satisfy the said District Council that such Dublin or local labour cannot be secured.

\* \* \* \*

Detailed particulars will be found in our advertising columns.

\* \* \* \*

Those who have visited New Ross have doubtless noticed the fine old Tholsel, the headquarters of the local municipality, a very nice building of the eighteenth century, with a particularly well-proportioned and attractive clock-tower and cupola. The other day we learnt that the architect of the Tholsel was George Kent. Kent was a notable architect in his day, and amongst the most important of his buildings is the Horse Guards in Whitehall. We were previously unaware that Kent had worked in Ireland.

The Department of Technical Education and Agriculture contemplate building a large Agricultural College at Athenry at a cost of over £30,000.

\* \* \* \*

Mr. Joseph Holloway, the President of the Architectural Association of Ireland, gave an admirable inaugural address, which he described as a talk, on Tuesday night. Elsewhere we publish the address, and comment thereon.

\* \* \* \*

Mr. T. A. Hall, M.Inst.C.E., who recently resigned the position of engineer of the Londonderry and Lough Swilly Railway Company, has secured the appointment of Government Engineer to the Colony of Newfoundland. The salary attached to the position is £650, rising to £900.

\* \* \* \*

In an early issue we hope to publish the first of a series of illustrated articles entitled "Toulouse and the Midi," by Mr. D. W. Morris. The articles, which deal with the architectural interest of that district, are a valuable record of a long tour, and are full of pleasant impressions.

\* \* \* \*

On Monday night last Mr. Michael Moynihan read an interesting paper before the Engineering and Scientific Association of Ireland on the subject of the proposed extension of the Dublin Waterworks system. Mr. Moynihan's paper, which we publish in part in this issue, contained many interesting particulars not hitherto published.

\* \* \* \*

A pleasantly-written and illustrated note on the life and work of George Devey, the talented architect of Kenmare House, Killarney, appears in this month's Journal of the Royal Institute of British Architects. Devey was one of those men of the older generation of Victorian architects who did a large amount of beautiful work, and yet were little known to the public.

\* \* \* \*

The Benchers of the Middle Temple in London have decided to mark with a suitable tablet the abode for many years of a great Irishman, Oliver Goldsmith, who lived in Brick Court, on the second floor. Here he resided when that immortal comedy, "She Stoops to Conquer," and "The Deserted Village," were produced. Here also he wrote several other of his best works, and in the Temple Burying Ground he lies.



## THE ARCHITECTURAL ASSOCIATION OF IRELAND.

## THE PRESIDENT'S ADDRESS.

The President, Mr. Joseph Holloway, remarked that his friends told him that he was a good talker, but a bad speaker. "That being so," said he, "it's best I should talk to you to-night."

**"A Talk not a Speech."**

I cannot make a set speech, then let us chat awhile of things interesting to us students (and we are all students here to-night, both old and young) of the beautiful and ennobling art of architecture—for did not the late Sir Gilbert Scott say:—"Once a student in art, always a student," and I agree with him.

A chat resembles a bee wandering in a clover field, it passes hither and thither from one subject or point to another, without much sequence, or object, just as the fancy flits across the mind.

So it will be with the few remarks I shall now address to you.

**The Young Architect's First Duty.**

A young architect's first duty is ever and always to keep his eyes open, and to scribble down anything that strikes him as odd or beautiful in the buildings he sees around him, and his next, in my humble opinion, should be to keep the dignity and honour of his profession ever in the forefront in all his professional dealings.

The Institute of Architects has set up a code for our guidance which ought to be strictly adhered to by all members of the profession.

**Unfair Tactics.**

Lately, I am sorry to say, a system of under-cutting has crept in amongst some members of the profession, and "work" has, in this way, often been wrested from those who scorn to do a mean or unprofessional act.

If you are not to yourselves true, nobody else will have confidence in you, and the prestige of our noble calling will soon have vanished altogether, as it is rapidly doing, under the new system of accepting any fees offered by a huxtering client, so long as you do a fellow architect out of the job.

How often do you hear, when you say to a new client that your fees are 5 per cent.—"Oh, that is absurd, the *great* architect, Mr. So-and-so, or the *eminent* Mr. What's-his-name, would do the work for 2½ per cent. or 3 per cent. at most."

If you are honest (usually styled unbusinesslike now-a-days) you tell him to get it done elsewhere at reduced fees if he can, as your fee is the only professional one recognised by the Institute, and you cannot see your way to do it for less.

So off he goes, and more than probable you never see him again! This cutting down of fees leads to dishonesty, for architects must live as well as other folk, and "hand-overs" from builders and trades people inevitably follow the reduction of fees, as the legitimate 5 per cent. allows for barely a living wage, unless you are in a great practice.

**Undercutting.**

There are many methods of undercutting—the one mostly in practice, I have been informed, is to pretend to work for the full 5 per cent. on the distinct understanding that 2 per cent., or more, will be returned as a gift afterwards.

This is a subtle way of evading the rule of the Institute, and getting the inside of more upright brother professionals.

**A Contemptible Habit.**

This habit is most contemptible; pray you avoid it, and raise the profession to the dignity it once held—and justly held—in this city before it is too late.

As I said before, it is hard to re-create a standard once it has been abused for immediate personal gain.

The position of architects of late in Dublin, has not been an enviable high one, and the above, in my opinion, is the immediate cause of the man-in-the-street's poor opinion of the profession.

To yourselves be true and fear no man!

**Architects and the Law.**

If you want to see how your worth is valued, attend at a law case in the Four Courts, where architects are engaged

as professional witnesses, and then you will, most likely, hear some home truths from counsel or judge that will make you justly indignant, if you have a spark of respect for the honour of your calling.

Quite recently I was in attendance at such a case, when the judge sneeringly referred to the profession, as witnesses "whose opinion could not be relied upon."

Whereupon I arose in the court, and asked him "To withdraw those words." As a member of the profession I repudiated his slanderous remark!

Of course, I was angrily told to "Sit down," by the challenged judge; whose opinion, I suppose, was shared by most in the court.

Architects, as witnesses, are food for jest in a court of justice!

This poor opinion of their veracity must have had some foundation, or it would never exist.

As the old saying has it—"There is never smoke without fire!" and architects themselves must have originally lit that fire.

**Plain Speaking.**

Straight talking is sometimes necessary, and clears the air of cant; that is why I speak to you here to-night in such straightforward way.

**A Plesanter Subject.**

But to change the subject. I would advise you practising in Ireland, ever and always, to use the native stones, bricks, slates, etc., when and where you can.

Of course, this advice is scarcely sound to give to the coming race of architects, as it takes the bread out of their mouths, as it were, for the houses thus built last till doomsday, whereas those built with foreign stone, etc., often commence crumbling away ere the mortar with which they are set is dry, and give the coming architects a chance of rebuilding or restoring the same work twice in a lifetime at least.

**A Good Example.**

The Scotch architects, who designed the building at the Nassau Street end of Dawson Street, set the good example of having their work carried out in our own native beautiful limestone, and, I am pleased to see that some of our Dublin architects have since taken the hint and introduced limestone into their street architecture with very gratifying and picturesque results.

It stands to reason that the materials of a country are the best and most suited for buildings in that country.

How characteristic are the homes, in the different countries of England, of the locality on which they are reared. They seem part of the place, grown naturally out of their surroundings, as it were. And why, may I ask? Because the local resources are ever employed to bring about this happy result.

This picturesqueness and appropriateness must strike everyone who visits the Cotswolds, for instance; and during our recent delightful excursion to Northamptonshire the appropriateness of the buildings to their surroundings was very marked in many of the towns and villages we passed through.

Ours is a damp climate, and the half-timbered houses, which are recently being erected around Dublin, are not at all suitable to our country on that account at least.

They are "at home" in the rural districts of England or in the suburbs of English towns, but our moist atmosphere plays "Old Harry" with them after a time.

**Shoddy Imitation.**

The "grand old homes of England" architecturally are the admiration of all, but our methods of living are now quite different, and the plans that suited in those far off days are scarcely adjustable to our modern civilisation. For example—On a fashionable road not a hundred miles from Dublin is a small house, designed on the Baronial Hall plan, with the entrance porch leading into an ample hall used as a living and dining room.

This arrangement was all very well for an old country home centuries ago, but for modern, every-day life, in a villa near a city, it is not practical.

Well, what I have to tell you is, that the proud possessors of this modern copy of an old-fashioned English home gave a house-warmer—a dinner party—and, in the midst of an unwelcome visitor called—a friend not asked to the feast, and, on the door being opened, lo! there were all the guests discovered; and the host and hostess then and there found out that their wonderful new home was not quite the gloriously convenient place they had so boastfully eulogised it to be to their friends beforehand. And the result was that a new dining room (that knocked the original design quite out of focus) had to be erected, at the cost of some hundreds extra, at the rear.

Picturesqueness is all very well, but those first attracted by a novel outside soon find out that it is the inside that really matters.

#### The Fine Old Dublin Mansions.

Take any of the fine old Dublin houses—all had plain outsides (and there must have been some good reason for this; for the old knights of the T square knew what they were about as a rule), but the interiors were, and in many cases remain really beautiful, and as comfortable and habitable as any concocted from foreign examples, which acclimatise so very indifferently with our weeping skies.

Study the best examples in our own country, and try to improve upon them on their own lines, introducing all necessary changes required to make them thoroughly up-to-date.

Every country has its own style of architecture, and every town ought to have its characteristics.

By all means be up-to-date in your designs, if you will, but why up-to-dateness in architecture should mean, in nine cases out of ten, grotesque ugliness, passes my comprehension; yet such is the case without a doubt.

#### The Modern Villa.

Think of the recently-erected buildings of pretension in and around our city, and you cannot truthfully answer me otherwise than they are not beautiful, as a whole.

I am not troubled with nightmares in my sleep, but I have had many in my day dreams, as I walk the streets, and behold some of our modern horrors! Such as—but the pleasing task of filling up the blanks I'd rather leave to you.

I hate to see the variegated sugar-stick kind of terracotta houses, that have come out like a rash on our streets in recent years; and also crockery-ware exteriors, are like a red rag to a bull to my sense of beauty. Give me a fine, well-designed, stone building, or failing that, a warm brick house, with limestone dressings, judiciously employed, and you have my ideal of a street front for Dublin.

Let "truth with art" be your motto in design. Avoid erecting gables with no support behind save an iron bar. This style of architecture is popular, I have no doubt, with iron founders, but Art shivers when it contemplates such makeshift attempts at designing. Dublin is rich in examples of this pattern.

Always remember to design with an eye to utility, and most likely you will arrive at the golden rule of "truth with art," without knowing it, almost.

As I said before, use native stone as far as possible. Take warning by the spire of John's Lane Church, and let imported sandstones remain anywhere other than in your buildings, unless you wish to give the rising generation of architects an additional chance of employment.

#### Irish Materials.

Now, here in Ireland, the simple-minded would imagine we had excellent granite enough, and to spare, to meet all our limited requirements (what with Dalkey, Newry and Galway granites to mention but a few), yet some of us must rush to Belgium for the article, or to Aberdeen mayhap. Oh! the farce of the whole thing sickens me! The cry is that we can't get *our* granite up to time; yet, I have been creditably informed, that a job within a stone's throw from here, has been delayed for more than three months waiting for the foreign stuff to arrive.

Certainly we architects in this country, are true to the old land, and no mistake, (moryah!).

By the way, did it ever strike you that all Irish architects

should be Home Rulers, when they think of what was accomplished before the union in the way of architecture in Dublin?

All (or nearly all) the fine old buildings we are so justly proud of in our city were erected during the sitting of the Irish Parliament in College Green, and why not again, may I ask, would not our city be beautiful by glorious new poems in stone, had we a Parliament here of our own?

Those who are incredulous of the fact need only visit the National Gallery, and, for a few minutes, look round the room in which the prints of old Dublin are to be seen, to verify my statement, despite Oscar Wilde's pronouncement in his lecture on "The House Beautiful," that "there was no place so absolutely depress as a museum."

#### The Museum.

I would advise students to walk through the National Museum, whenever chance affords an opportunity. You cannot fail to see something to interest you and please your artistic sense, no matter, how short your visit may be, and one is always the better for having seen the beautiful and artistic though nought but a mental note be taken of what the eye has seen.

In giving you this advice, I don't wish you to close your eyes to our own little museum, which is getting along nicely and is full of interest to us all.

#### The Modern Shopfront.

Avoid that monstrosity, the modern shopfront—(huge sheets of plate-glass some 17ft. 6 in. high at least, kept in place by an inch brass bar). Fortunately this style of architecture is a "speciality" seldom entrusted to the tender care of architects to have carried out.

Shopkeepers say that they must be up-to-date, and to display the goods to the best advantage is what they require.

Drapers are the worst offenders in this direction.

So, I suppose, the ladies, God bless them all, are at the bottom of the craze for "all glass," and, indirectly, are the cause of out-of-proportion shop front architecture. Their gowns must be displayed, hence, Switzer's windows, and the innumerable copies that have lately sprung into existence.

Three or four storeys of masonry held up on walking sticks, is what such fronts resemble to my mind.

#### The Regent Street Quadrant.

Mr. Norman Shaw, who designed the new quadrant in Regent-street, London, would have none such monstrosities, and designed his fronts with good heavy pier supports. This got the "backs up" of a number of the best-known firms in Regent Street, and they have petitioned to the powers that be, asking that the design be reconsidered, and that some scheme, "whereby the line of shop windows will be uninterrupted," be substituted.

They admit that Mr. Norman Shaw's work is an artistic triumph (how very kind of them), and that in Lombard Street it would probably be everything that could be desired. For Regent Street, however, they contend that it is too elaborate, (I quote from "The Tribune" of June 11, 1906), and financially beyond the reach of the ordinary lessee. They also complain that the heavy columns on the ground floor of the shops will not only take up too much window space, but will break the continuity of the window line. As a result, the thoroughfare will, they fear, be entirely ruined as a shopping centre.

On being asked if he (Mr. Shaw) thought the Street would be ruined from a shopkeeper's point of view, he expressed the opinion that the opposite would be the case. "People went to good-class establishments, not because of any window display, but because of the quality of the goods that could be obtained. A quiet, restrained window exhibit appealed to the better class of customer. They were certainly not attracted by a loud and blatant show, such as might appeal to the shopper in a poorer district. Certain stores which had no window display were yet well patronised."

I have not heard what was the result of the petition, but I am almost certain that the shopkeepers triumphed!



Art never has a look in when commerce has a say in the matter! And more's the pity!

#### A Talk with Norman Shaw.

Mr. Shaw, in a talk with a "Daily Chronicle" man some time ago, had much to say that was of interest to young architects.

"It is intensely important that in great matters, as in small, the use and structure of the building should be the basis of every kind of ornament that is demanded." What golden advice is here expressed, and how few follow it.

Again, hear him speak his words of wisdom:—"It is no good having ornaments that are merely ornaments, and not structural. Thus the dome over the Gaiety Theatre (London) is bad. It is not needed, it is not structural, but just stuck on like a knob. The result is that there seems something, even to the layman, indefinitely wrong about it."

This result usually comes from "designing on paper" and loading your work with all sorts of pepper-box domes and unnecessary projections, and never thinking for a moment how all such flourishes and excrescences will look when the design is realised, and your draughtsmansque flights of fancy reproach you in brick or stone.

#### Draughtsmanship.

Remember, drawing is only a means to an end, and an architectural drawing should always explain itself and nothing more. A picture is one thing, and a practical drawing quite another pair of shoes. Few architects bear this in mind, hence the fearsome and wonderful things that sometimes pass for architectural drawings nowadays.

Artists were invented to make pictures, architects to make practical working drawings, though many of them think differently, and try to usurp the artist's place.

Everyone to his trade, say I; therefore, I cry "hands off!" to architects who would be artists at the expense of good architectural draughtsmanship.

By the way, the ink-drawings of the students for the various prizes last session were deserving of all praise—they were the sanest lot of architectural drawings I had seen exhibited for years. Mr. Ramsey's set of measured drawings of Leinster House were all that first-rate careful architectural draughtsmanship ought to be, and his "survey notes" were deserving of all praise also.

The "three sets" for Institute prize for a bank, I also thought excellent.

The designs for parish hall and library were more on the lines of the artist-architect order—neither one thing or the other.

The perspective by the prize-winner was cleverly impressionistic to eccentricity.

#### Smudges.

Avoid smudges in colour, that are neither drawing, water-colour, nor design, but merely smudges.

Few architects excel at water-colour; therefore, it is better to leave it alone as much as possible in their architectural work.

Oh! the daubs we see, as a rule, masquerading as high artistic, with all form and line obliterated from the sketch so smeared! They make me "feel silk," as the Americans say!

#### Competition Drawings.

In competition drawings, a bad, glaring, water-colour often takes a Board, who like colour; and frequently a very indifferent design has secured the prize in a competition by being concealed in gaudy paint.

This being so, I would advise paint for Boards, but never for builders.

No line other than what is required to explain your work should be put on a working drawing.

#### "Faithful Execution."

I remember once an admirable and artist draughtsman, who had the habit of partly shading his full size details, and dotting his pencil frequently into the paper in a series of full stops, drawing a cornice in this way, and when he went to inspect its erection he found that all his superfluous dots, flourishes, etc., had been copied with Japanese-like accuracy by the carpenter entrusted with the work, and the whole design spoiled, and the builder put to some £70 extra expense by the artistic embellishments of this impractical draughtsman.

An artistic drawing is one thing and an architectural quite another. Few modern architectural draughtsmen think of this; hence the number of elaborate drawings, and the extreme poverty of the design when carried out.

Ruskin somewhere has said: "It is not necessary for an artist to be an architect, but it is necessary for an architect to be an artist," with which statement I am in perfect accord, but that does not alter in the least what I have just said, and I hold that a good, straightforward design, without any flights of fancy of pen or pencil, that looks well on paper, is almost sure to be a success in reality—when the work is transferred into brick or stone.

#### Sketching.

Sketching is one of the most useful and important accomplishments that a young architect can practise. Always carry a note-book and make use of it freely. Bear this in mind—mental notes fade, but those committed to paper never. Therefore, I say to you, jot down everything you want to preserve; and always remember sketches need not be finished drawings to serve their purpose, and keep useful and beautiful things ever fresh in your mind.

For architectural purposes, the merest scribble accurately jotted down, including a few dimensions, as a rule, does just as well, and in many cases better than flashy-looking sketches that lack detail and definite form.

Speaking of sketching recalls to my mind the story of the school teacher, who one day during the hour for drawing suggested to her pupils that each draw what he or she would like to be when grown up. At the end of the lesson one little girl showed an empty slate. "Why," said the teacher, "isn't there anything you would like to be when you grow up?" "Yes," said the little girl, "I would like to be married, but I don't know how to draw it." But to get back to our "muttons."

#### A Rich Field in Dublin.

I would strongly recommend the advisability of some of you sketching the fine old doorways, fan sashes, railings, etc., that abound in Merriion-square, Fitzwilliam-square, Merriion-street, St. Stephen's Green, and in many of the streets on the North side of the city, a section of Dublin now "down on its luck," as one might say.

They are all well worthy of study, and as fine specimens of their period as exist anywhere.

#### Earnestness.

Earnestness is the key-note to success in every walk in life, and Mr. Shaw says he sees energy, energy, energy everywhere in the architectural profession in England. "Above all," he says, "our architects are working nowadays in what seems to me the right direction towards the evolving of what we have needed so long—a characteristic modern English style."

They are beginning to devote themselves to structure instead of thinking, as used to be the case, that it was beneath an architect's dignity to do anything else but "lay on the trimmings." So far as I can see, the reason why Victorian architecture has so poor a record is simply because our architects were jumping about from one foreign style to another, trying to find a tradition instead of making one of their own. On the other hand, what is needed, and what I think is being done, is the evolving of a native English style of architecture—domestic at any rate—based upon our own climate, our own materials, our own ways of life, and our own landscape."

#### Truth and Honesty in Design.

Now why, I ask you, don't we here in Ireland try to do the same and evolve an Irish style of architecture, based upon our own climate, our own materials, our own ways of life, and our own landscape, and not persist in presenting weak copies of the English style referred to by Mr. Shaw, which are all very appropriate to England, no doubt, but quite out of harmony, in my opinion, to the misty loveliness of our weeping skies?

A lustier style is required than the tasty-looking, fragile Swiss cottage types (as half-timbered work is invariably called by the lay critic) that our architects are causing to be erected round the city. Nice to the eye in many instances, and, no doubt, expensive to the pocket, but not of this country for all that.

Oh! for the patriotic architect who will exclaim: "A plague on all your houses from the other side, I'll make some of my own!" Oh! for a little colony of such!

#### The Annual Excursion.

Our annual excursion to Northamptonshire was a delightful trip; admirably looked after by Mr. Edwin Bradbury, our worthy and popular vice-president, and though it was a great rush to accomplish so much in such a short time as was crowded into the programme, a surprising lot of good, useful work in the way of sketching was done by most of those who took part in the outing.

Mr. Stephenson, of Northampton, and Mr. Gotch, of Kettering, deserve our sincere gratitude for the trouble they took in the arranging of trips and in personally conducting us while there.

**Visits to Buildings.**

Visits to buildings in the course of erection are of immense value to students, and ought never be missed, except under exceptional circumstances, by any of the members.

**Freaks!**

As a last word, I would implore you to avoid concocting freak shop fronts, rearing mock gables into the high heavens, using red, crumbling sandstones, and erecting flimsy attempts at half-timbered work. None of these should be thrust on poor old Ireland; she has already enough burdens to bear!

I also have a holy horror of painted stone, and notice with exceeding regret that quite recently many shopkeepers are painting the fine limestone pilasters to their shops in glaring white, and destroying the artistic appearance of the fronts by their unthinking vandalism.

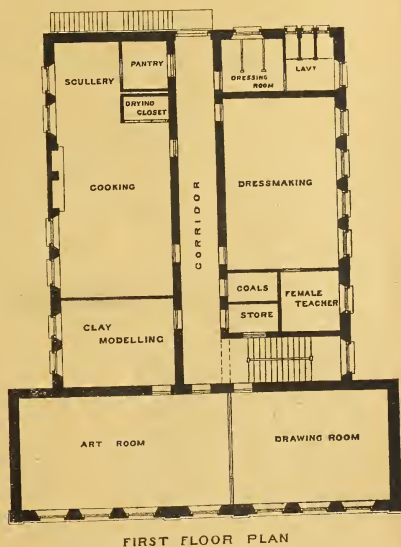
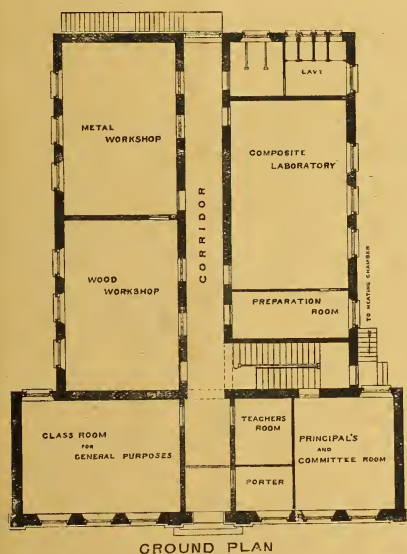
There should be a law passed to prevent this sort of thing!

**The Modern Youth.**

A speaker a little time ago at Birmingham said that the majority of young men entering business to-day are dull, unambitious, and unashamed of their lack of qualities. They originate nothing, and their only desire appears to be to shuffle along on the lines of least resistance.

**WATERFORD CENTRAL TECHNICAL SCHOOL.**

On September 26th, the new Waterford Central Technical School was formally opened. The area covered is 87 feet deep with a frontage of 70 feet. The contract was entrusted to Mr. P. Costen, builder, at £3,783. The front of the building is of Kilkenny limestone from Messrs. Collis' quarries. The super-structure is built of local bricks, the manufacture of the Waterford Brick Company. The cement used was Drinagh, Wexford, cement. The roof over central corridor and art room is glazed with the Haywood combination system of glazing. The roofs are slated with slates from the Killaloe quarries. The locks and furniture are the manufacture of Messrs. Gibbons, of Wolverhampton. The system of heating is the low-pressure hot-water installation with radiators. Messrs. Heame and Co., Waterford, got the contract for the furnishing of the Chemical Laboratory. The chemical benches have all the latest improvements, and in the opinion of experts this laboratory, for its size, is more up-to-date than any other at present in operation in Ireland. The remainder of the furniture contract was divided between the above firm, Messrs. Robertson and Ledlie, Waterford, Messrs. T. Darry and Son, Kilkenny, and Messrs. Martin, North Wall, Dublin



The Waterford Technical School.

Let you show that this opinion is false, as far as Ireland is concerned, at all events, by doing something original for the old land, in evolving a style of architecture all "our very own," as the English, according to Mr. Shaw, are doing for their country.

Let us follow England's example in this respect, at least, and show her there is no ill-feeling existing between the countries when she points the right way for us to go, by example. Avoid copying, but always keep your eyes open, as I said before, to the merits or defects of the work around you.

I cannot do better, by way of conclusion, than quote a passage from an article on "The Mission of Architecture" in "The Building News" of September 7th last, which says:—"Architecture has its mission in small things as well as great, and every architect, whether he is aware of it or not, is a missionary who owes it to society to perform his mission well, to pander as little as may be to the lower taste of his day, but to strive by the production of honest work, well-designed, harmonious, and suitable, to improve the lives of his fellow-creatures and to hand down a lasting record of all the better qualities of his time, that others who come after him may appreciate and be the better for what he has left behind."

Although this paper is confined to building and engineering matters, it may not be out of place to state that the whole of the contract amount for the building, together with £1,000 for furnishing, was borrowed on the strength of the local rates, and not a penny was contributed by the Department of Agriculture and Technical Instruction towards this expenditure. The payment of interest and principal on this amount will reduce the money that should be devoted entirely to technical education by £400 per annum.

The School is designed on the corridor system, i.e., no room is used as a passage, but each room is approached from a common corridor. The advantages of this system are: (1).—From an hygienic standpoint it is an ideal system in as much as the building is divided almost into two sections by two corridors parallel and one above the other; these act as natural ventilating shafts and keep the air in the interior of the building in constant circulation. (2).—In case of fire the flames can be confined to one wing of the building and expeditiously got under control. (3).—The loss of room is reduced to a minimum—supervision during movements of the school is reduced to its simplest form. The Headmaster from the corridor can command



the door of every class-room. The Boyle Natural System of ventilation is the system used, the foul air is taken off at the ceiling level of each class-room, and the proportion of the air inlets to the foul air outlets is so arranged that the air is completely changed in each class-room three times an hour.

It is through the generosity of the Chairman of the Technical Instruction Committee, the Most Rev. Dr. R. A. Sheehan, that the stone front was erected. A stone front was not included in the original contract, but his Lordship, in order to have it in keeping with the other public buildings of the city, inaugurated a fund, heading it with a subscription of £200; the remaining portion was subscribed by the citizens.

The architect was Mr. J. J. Fleming, Assoc. M.Inst. C.E.I., Lady Lane, Waterford.

## IMPORTS.

### PORT OF DUBLIN.

October 30th.—Per City of Dortmund, from Hamburg and Ghent, 1,890 casks asphalt, 1 case window glass, 3,700 bags cement, 14 cases marble, to order.

October 6th.—Per Belfast, from Baltimore, 253 pcs. poplar, 363 pcs. oak, 75 tons roofing slates, to order. Per Lady Wolsley, from London, 1,789 bags cement, T. Dockrell, Son and Co., Ltd.

October 8th.—Per Hellik, from Christana, 113,969 pcs. boards, 7,255 pcs. scantlings, 500 poles, T. and C. Martin, Ltd. Per Bangor, from Rochester, 340 tons cement, T. and C. Martin, Ltd.

October 9th.—Per Surrey, from Archangel, 8,724 pcs. deals, ends, and battens, Brooks, Thomas and Co., Ltd.; 11,669 do. do., Robinson's, Ltd.; 3,030 do. do., to order. Per Enid from Rochester, 190 tons cement, A. Agnew. Per Lady Hudson-Kinahan, from London, 1,100 sacks cement, T. Dockrell, Son and Co., Ltd.; 700 do. do., T. Archer.

October 11th.—Per Maggie Warrington, from Ghent, 11,257 bags cement, 16 cases limestone, to order. Per Winga, from Göteborg, 613 bars iron, 114 cases glass, 4,770 bds. planed boards, 4,250 bds. laths, 13,003 pcs. planed boards, 80 bds. iron, to order.

October 12th.—Per Coniston, from Chester, 150 tons bricks and tiles, T. Archer. Per Elizabeth Hyam, from Chester, 100 tons brick, tiles, J. Kelly and Son. Per Bonahaven, from Glasgow, 5 tons fireclay goods, J. E. McCormack, Bray.

October 13th.—Val de Travers, from Treport, 150 bags plaster, to order. Per Wild Wave, from Irvine, 120 tons fireclay, Brooks, Thomas and Co., Ltd. Per Viola, from Chester, 127 tons bricks and tiles, M'Naughton and Co.; 48 do. do., J. and R. Thompson; 31 do. do., — Henshaw; 4 do. do., J. Fitzsimons. Per Florrie, from Bridgwater, 130 tons bricks, etc., T. Archer.

October 15th.—Per City of Brussels, from Hamburg, 1,890 cks. asphalt, to order. Per India, from London, 430 tons cement, T. and C. Martin, Ltd.

## CHURCH OF THE THREE PATRONS, RATHGAR. Recent Improvements.

The clergy and people of Rathgar parish have genuine reason to congratulate themselves on the splendid work which has just been completed in the decoration and improvement of the Church of the Three Patrons. In external appearance the sacred edifice ranks prominently among the ecclesiastical buildings of Dublin, and with the internal alterations which have been carried out during the past summer, it now stands a fitting monument of the zeal and generosity of the Catholics of Rathgar, and worthy in every respect of the Divine ministrations of religion. The improvements have been designed after a style well adapted to the architecture and character of the church, and executed with admirable taste and finish. Well lighted, chaste, and harmonious in its general scheme of decoration, the interior possesses a pleasing and graceful impressiveness entirely in keeping with the sacred character of the building. The work was first undertaken during the Very Rev. Mgr. Fitzpatrick's charge of Rathgar parish, that rev. gentleman feeling that the design of the existing ceiling and condition of the walls generally were far from being what he desired. The contract for carrying out the necessary work was accordingly given to Messrs. Martin, decorators, of Stephen's Green, and the various improvements have been executed under the directions of Messrs. W. H. Byrne and Son, architects. The original ceiling, which was in several places considered to be in an unsafe state, has been completely removed over both nave and aisles, and a handsome new ceiling of fibrous plaster, relieved with bold and artistic mouldings and enrichments, has been erected. The ceiling is divided into panels by moulded ribs, the effect being at once imposing and handsome. The inside of the sacred edifice, including the ceiling, has been painted in fine oil colours, and tinted and relieved very artistically in shades of soft green, cream, terra-cotta, etc. A conspicuous feature in the scheme of decoration is the large and handsome cross in the centre panel of the chancel ceiling, which is beautifully gilded with gold-leaf (of Dublin manufacture). The capitals of all the pilasters around the church are tastefully picked out in gold, and harmonise agreeably with their surroundings. The painting and decoration work has been carried out in Messrs. Martin's usual style, and reflects great credit on that firm. The fibrous plaster-work was executed by Mr. Ryan, Upper Abbey Street.

In the beautification of the Church of the Three Patrons, the present esteemed pastor, Very Rev. Charles Malone, has devoted himself energetically to the work since its inception, and his efforts have been nobly supported by the generosity of several of his parishioners. The new bell and belfry, the gift of two Rathgar ladies, will prove a much-valued addition, and give it a finished and imposing aspect. The belfry has been erected at the instance of Mrs. Smyth, Sen., of Palmerston Park, to the memory of her late husband, and the bell has been presented by Mrs. Smyth, Jun., in memory of her deceased uncle, Mr. John Regan. In the carrying out of the various improvements, the material employed has been exclusively of Irish manufacture.



The New Technical School at Waterford.

**Clonmel.**—Messrs. Ashlin and Coleman have been instructed by the Very Rev. Canon Flavin, P.P., to prepare plans for alterations and additions to St. Peter and Paul's Church, Clonmel. Mr. D. W. Morris is the surveyor, and tenders will be invited about the first week in November.

**Dublin.**—The following tenders have been received for the building of new workmen's cottages for the Merchant's Warehousing Co., Ltd. (Mr. F. W. Higginbotham, A.M.I.C.E.I., architect):—Messrs. Whelan Bros., £4,370; Mr. G. Scott, £4,600; Messrs. Farmer Bros., £4,704; Collen Bros., £5,500; Mr. H. Monks, £5,586; Messrs. J. and R. Thompson, £5,620; Messrs. J. and P. Good, £5,750; Mr. Peter Byrne, £5,770.

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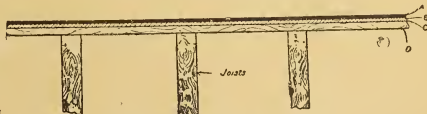
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## ARCHITECTURAL MORALS.

Mr. Holloway, in his Presidential address to the members of the Architectural Association of Ireland, told his hearers that he came to have a talk with them—not to make a speech. And a very admirable, clever, witty, and withal practical and helpful talk it was. At the outset, Mr. Holloway touched upon an unpleasant subject, and we must confess his observations fell upon our ears with a feeling of pained surprise. We have so long and so persistently boasted of the superior architectural morals of Dublin, of the touchingly fraternal relations amongst our architects, and we have with, as we thought, pardonable pride, offered thanks that we were not as other men, so Mr. Holloway's scathing remarks caused us much surprise. Mr. Holloway said he would speak plainly, and so he did. He boldly stated, and for the benefit and warning of the younger generation, that architects in Dublin were no better than they should be; that some men had no hesitation in undercutting fees to secure work; that 3 per cent. commission, and even less, by so-called eminent members of the profession was frequently accepted. Had any person in a less responsible position made such observations, we should have dismissed it as idle gossip. But Mr. Holloway, as all who know him can testify, is no gossip, and to such it was evident that his words, spoken under such responsible conditions, were well weighed and deliberately chosen.

Now, notwithstanding, we were fain to say to ourselves that Mr. Holloway had taken a somewhat sourced view of the situation. During a somewhat varied experience throughout Ireland, we have never come across, save once or twice in the North, an example of that huxtering client depicted by Mr. Holloway; nor have we come across the undercutting,

unscrupulous architect who will take any fee so long as it enables him to do a brother architect out of a job. Such men, we fancied, were rare, extremely rare, and limited to those one or two notorious black sheep who defile every calling in life, and are doubtless readily to be found even in Dublin; but that the evil had reached the dimensions indicated by Mr. Holloway, we never dreamt. We had congratulated ourselves that the genus had almost died out, and now the unsavoury fact is forced upon us that all the time we have been but as whitened sepulchres—that is, if Mr. Holloway is right; and unpleasant as the conclusion is, as he says himself, "there can be no smoke without fire"—an old, but not always very safe, saw. Mr. Holloway tells us that to be honest nowadays is to be called unbusinesslike. But Mr. Holloway came down to the Association rooms not to level a charge of professional misconduct against his brethren, in an assembly which was not the proper venue for such a charge, but rather to point a moral for his young hearers. Now, how can the moral be pointed? Competition in the abstract is an honest and frequently healthful resource of honest commerce, and in business affairs men daily undersell their dearest friends, and are none the worse friends for it, after all; but then it is done openly, honestly, and fairly, as a rule, but at all events it is well within the knowledge of the competing rivals that such is the custom of the trade, but such is not the case with the architect who undercuts in the matter of fees. He has entered into either an implied or deliberate pact with his fellows, and particularly true is this of members of societies or institutions, and the meaning of the implied compact is, that none of the parties to it will work save under certain conditions. If one does so, he breaks faith with his fellows, and if he gains profit thereby is guilty of a contemptible trick. Of course, there are certain classes of work, such as repetition, with regard to which it is well understood that modified fees may be accepted, and therein there is no breach of faith. It is well, too, that young architects should early learn that such tactics, though they may result in occasional profit, are after all but the sharpening of a knife to cut one's own throat, for clients become in time demoralised thereby. Such an instance as Mr. Holloway gives of returning part fees as a subscription is even more contemptible than any other form of similar action. Moreover, as Mr. Holloway adds, this cutting down of fees leads to dishonesty, for architects must live as well as other people, and "hand overs" from builders and tradesmen inevitably follow wherever the standard is lowered, for the legitimate 5 per cent. allows but a bare living wage, save only in the largest buildings. It is, however, an unpleasant subject, and one upon which we would rather not dwell; and indeed Mr. Holloway talked on many more pleasant topics. His denunciation of the use of English and foreign brick, terra-cotta, slates, and so on, was distinctly appropriate. Almost everything manufactured for a building we import, and if we add these to foreign bricks and slates, the result is bound to be incongruous, and hence bad art.

Of flimsy imitation half-timber villas, too, he dis-coursed, and in no measured terms; and roundly protested against "freak architecture." No wholesomer talk could have been offered to students, if only to save them from being swallowed up in the wave of impressionism and fleeting fashion. To the young men he held up the work being done in England towards building up a national style, and appealed to them to produce not a weak and flabby imitation of English work and methods, but to follow the principle of the Englishmen, and develop a native and racy style of work, suited to our character, needs, habits, social customs, and general conditions, rather than strict adherence to rote and rule.

## COMMENTS.

### The Sewage of Belfast.

The Royal Sanitary Institute held a sessional meeting in Belfast on 5th inst., when examinations were held, papers read, and places of sanitary interest visited. Amongst the most important of the papers was Councillor Dr. Williamson's address on "The Sewage Purification Problem, with Special Reference to Sewage Discharge into a Tidal Estuary," his remarks being illustrated by a diagram lent by the Improvement Committee. Having alluded to the general physical features of Belfast, and the rapid growth of the city in its early days, the speaker referred to the main drainage scheme prepared in 1865 by the late Mr. J. J. Montgomery. In his (Dr. Williamson's) opinion it was because the scheme of 1865 was only carried out in 1885, and then only in a modified form, that much of the trouble attributed to the main drainage had since arisen. With the aid of the diagram, the speaker explained the main features of the system, and went on to enumerate some of the difficulties with which the former City Surveyor (Mr. J. C. Bretland, M.Inst.C.E.) had to contend when he began to carry out the scheme. In order to obtain an outlet of a satisfactory nature on the outgoing tide, the sewage had to be stored in a reservoir, and permission was given by Parliament to discharge for three and a half hours after high water, the intention being that the tide should ebb for three hours after the discharge ceased, and thus carry the sewage away into deep sea. The effect of this in actual operation was to clean the banks of the Lagan above the bridges, and soon after the works came into operation fish were caught in the harbour and far up the river at places where they had not been seen for many years previously; the smells from the river banks also ceased, and the improvement in the condition of the harbour and river was apparent to everyone. Whilst this improvement occurred within the city, complaints arose that the smell on the foreshore on both sides of the lough was becoming worse. Everyone along the shore condemned the main drainage, and it was made responsible for all the evil smells, real and imaginary, detected anywhere between Belfast and the mouth of the lough. As those who arrived by steamer might have observed, many thousands of acres of the foreshore were dry at low water. On the sloblands, as they were called, seaweeds, chiefly *ulva latissima* or sea-lettuce, had developed in increasing luxuriance since the sewage discharge was concentrated in its present position. Proceeding, Dr. Williamson alluded to the steps which had been taken with a view to dealing with the foreshore nuisance, and argued that a sewage farm was impracticable for Belfast. Bacterial purification seemed to have been a greater success than any other yet in use, and to-day everything was to be said in its favour. In his opinion it would take some years to eliminate all the material which was food for the weed, and the towns and villages on the lough would have to be compelled to do what Belfast was doing before they would have an unpolluted lough and a pure atmosphere.

A discussion of some interest ensued. Mr. Kaye-Parry, who spoke first, said that in Belfast the results of sewage discharge had been different from those of almost any other town. It appeared to him that if the sewage was discharged on the ebb tide, and if the dilution was sufficient, they could discharge large volumes of untreated sewage into a tidal estuary without creating a nuisance. That had been proved at the Rathmines and Pembroke outfall, but, as had been shown, the conditions in Belfast differed to such an extent that some purification might be necessary.

### A Strange Condemnation.

The general trend of the opinions expressed was entirely in favour of the bacterial system, though Mr. James Dempsey complained that the storage tank was placed too low. Effluent had been discharged at low tide, and as a consequence the incoming tide brought the sewage back, depositing it on the shore of the lough. He contended that the city was splendidly situated for discharging a great volume of sewage into deep water. He made the extraordinary statement that he was satisfied that the bacteria-bed system was a humbug. We are at a loss—as, indeed, his audience must have been—to know on what grounds Mr. Dempsey bases so strange a view, and one which differs so fundamentally from that of the vast majority of engineers who have had experience of the system; but it seems rather late in the day to announce it. Anyhow, if Mr. Dempsey is right, then we have all been working entirely in the wrong direction, and the united efforts and research of the past dozen years count for nothing.

Professor M'Weeney, who followed, described the conditions existing in Dublin. He differed from Mr. Parry with regard to the discharge of crude sewage, which, he thought, was most objectionable. Dealing with the hygienic and economic aspects of the effect of sewage discharge in tidal estuaries, he instanced the pollution of shellfish, the befouling of sea-water, and the lowering of the vitality of the inhabitants through the inhalation of foul gases. Professor M'Weeney's observation in regard to the discharge of crude sewage should, of course, be judged in the light of particular circumstances, and by what is meant by crude sewage, a very wide term that covers an exceedingly divergent class of sewage. Some sewage has added to it so much liquid from streams or water courses as to have its character very materially changed, while in other places the sewage is naturally of a very dilute character. Then a great deal would also depend upon the comparative volume of the sewage. A small quantity of such very dilute sewage, for instance, discharged at a promontory at the time of a very strong ebb would obviously be so insignificant, and also so broken down in transit through the sewers as to become practically negligible. Such a sewage would be rapidly dissipated in the sea. On the other hand, a concentrated sewage of large volume discharged into some tidal estuaries might easily become a grievous source of trouble and a nuisance owing to the ebb and flow of tides, and the possibility of deposit on the shore. Professor M'Weeney stated that the primary object of bacterial treatment being to render an effluent suitable for pouring into a drinking water stream, he doubted whether it was really called for in the case of a tidal estuary. The primary object is certainly as stated, but another object is liquefaction. It is evident that in certain cases a comparatively inoffensive crude sewage might easily be more dangerous and objectionable than a more concentrated, fouler, and decomposed, but liquified, sewage. The latter would, if of no very great volume, be soon dissipated in the sea, whereas with the former the presence of solids might render it very unfit for crude discharge, especially as Dr. M'Weeney tells us that he was inclined to be sceptical as to the power of the typhoid germ to survive the septic tank and contact beds. This statement accords with the views of Dr. Klein, the eminent bacteriologist, and although in the present state of our knowledge it would be unwise to be dogmatic, still should further research upon the part of scientists prove this view to be accurate, we shall have made a decided step forward, which would bring us this far, that a bacterial tank effluent, even if more malodorous than the crude sewage, would be much less likely to spread infection by reason of the destruction of the disease germs. Other expressions of opinion were offered by other speakers, who were generally in accord



in preferring bacterial treatment, which, moreover, has the merit of greater simplicity. The assistant city engineer, Mr. Munce, and the harbour engineer, Mr. Kelly, agreed in supporting this view. Dr. King Kerr said, after visiting Glasgow and several places in England with other colleagues on the Corporation, he was convinced that the precipitation process was a failure, and Mr. Wilkinson said the precipitation system was a complete failure at Lisburn, and they had been compelled to adopt the bacterial process. Dr. King Kerr added that he thought that the precipitation theory was dead so far as the ultimate purification of sewage was concerned. It was not the fault of the system if some bacteria beds were a "humbug;" it was the fault of imperfect construction. The system must be correct if land treatment was correct, but the difficulty had been to find areas of sufficient and proper quality to enable them to put the latter treatment on a proper basis. In Birmingham they were putting down bacteria beds every year. The bacteria system was a success when carried out under scientific conditions. Engineers' estimates, however, were cut down to such an extent that the work was often not properly done. With regard to the possible sterilisation of sewage, that was a difficult and unnecessary task, but typhoid-infected matter should be so treated before joining the main body of sewage. This latter point is one which is often lost sight of, particularly in the case of asylums and other large institutions, but is well deserving of grave consideration.

#### The Department of Technical Education and Architects' Designs.

The local papers record an instructive discussion which took place the other day at a meeting of the Strabane Technical Instruction Committee. It would seem that some two years ago the committee decided to build a Technical School, or, rather to convert an old building to that purpose, and the town surveyor, Mr. Stuart, was instructed to prepare designs. The scheme has since been the subject of considerable discussion from time to time. At the last meeting the above was referred to by one of the members. Mr. Toner said Mr. Bradley had applied for the plans for the Technical School, which were in the hands of the Department for some months. They were not sent, and Mr. Stuart had to wire, and got them. He thought it was an extraordinary state of affairs. The chairman said anybody who had any communications with the Department knew what an amount of red-tape there was. Mr. Toner said a lot of valuable time had been lost in building the school. The chairman said he had spoken to the inspector, who stated that they must have been mislaid in some pigeon-hole. The plans of the school were then gone into by the committee in detail. Mr. Toner said the committee were still of opinion that they could not accept the plans sent down by the Department. Mr. Feely—These arguments show you the fallacy of these people giving advice. The members present all agreed that the plan of the stairs as suggested by the Department was an impossible one. It was decided that Mr. Stuart should look into the matter, and report to the Department. The Chairman said that the Department did not want them to give up any of the house to the caretaker. The Rev. Dr. M'Hugh said that was also his reading of the letter from the Department. It was decided to tell the Department that ample room had been made for the caretaker and for the storage of coals in the building. Mr. Taylor said no matter what plans they sent to the Department they would criticise them, as they should do something for their money. Mr. Feely said the Department, in their own interest and in the interest of the country, should be taught a lesson.

It is impossible for a Government Department, any

more than an individual to please everybody; but in this case the local committee would appear to have some grounds of complaint, particularly as the Department was established upon lines which it was at one time hoped would keep it free of red-tape.

#### A Welcome Change.

Most unquestionably a welcome change has come over the aspect of building affairs in Ireland. Not a brisk stir of business exactly, but a relief from the awful condition of depression which for over three years has prevailed in the Irish building trade. Throughout the country there is unquestionably during the past three or four months a faint but marked revival. North, south, east, and west share in the general change. In Dublin, too, building is, we believe, brisker than it has been any time during the past two or three years. Grafton Street will probably be practically rebuilt within the next few years, and already several important houses are in course of reconstruction. Still, it will take a long time, and involve many a big change before we come back to the palmy days of fifteen or twenty years ago, when every Dublin builder had more work than he could do, and as yet the keen competition of the Belfast contractors had not made itself felt. May the revival continue and gather strength is probably the fervent wish of everyone connected with, or in part dependent on, the building trade.

#### OUR ILLUSTRATIONS.

##### The New Church at Timoleague.

We publish as a supplement to our current issue an illustration of the new church at Timoleague, Diocese of Ross, Rev. Peter Hill, P.P., from the design of Mr. M. A. Hennessy, architect, Cork, and we take the following description of the church from a competent source:—

"Timoleague is beautifully situated, within about two miles of Courtmacsherry, one of the many picturesque watering places on the coast-line of the Co. Cork. From an antiquarian point of view, the chief treasure of Timoleague is its venerable Franciscan ruin.

It was hoped at one time that portion of the Abbey might have been available for restoration (as was the ruin of the Trinitarian Abbey, Adare), but for good and sufficient reasons this was not so, and hence a new church had to be designed.

The architect, after much consideration, decided it was best to build in sympathy, if not in strict architectural harmony, with the old ecclesiastical structure, and hence the present design.

The style of this church may be described as Celtic Romanesque, idealised so as to answer the requirements of a modern parish church. The round tower, in its general features, is modelled on the best samples extant, but its modern treatment—if we may so designate it—has been firmly grasped, and instead of a more or less weak copy of the ancient towers, we have here a truly Irish tower, full of sympathy with the past, yet faithful to the needs of all true buildings; as Ruskin puts it: 'The nobility of a building depends on its special fitness for its purpose.'

Our space will not at present permit us to enter at much fuller length into the far-reaching effects which may flow from this original design. We may say we expect they will be many and great, and as the Gothic revival of seventy years ago was led by men of genius and enthusiasm, we will not be surprised if this, the revival of Celtic Romanesque, fell into the hands of men who, having long and silently studied and loved its rich and varied forms, will now make it a national style, enriched by the best of the past and by the skill and hope of the future, such as is the work of Bentley, in Westminster, and Drew, at Belfast, of other forms of Romanesque."

Messrs. Archibald Constable and Co. hope to publish as early as possible in the coming year a pocket book on Reinforced Concrete and Steel Frame Construction, by Messrs. Charles F. Marsh and W. Dunn, joint authors of the third edition of "Reinforced Concrete." The new third and revised edition of "Reinforced Concrete," by Mr. Charles F. Marsh, will be issued in the course of a few

## THE DUST QUESTION.

A number of gentlemen interested in public roads, including several country engineers, district surveyors, and members of the Press, visited Epsom recently, to inspect the Tarring Machines in operation there, by arrangement between the Epsom Urban District Council and the contractors, Messrs. Robert Johnson and Company, of 45 Parliament Street, Westminster, London, who are the sole concessionaires for Great Britain of Johnson's Lassailly Road Binder. The machines consist of a huge steam boiler for the rapid heating and transference of coal tar, and a wheeled distributing tank, by means of which combination tar, heated to a temperature of 200 deg. Fahr., can be applied to a road at the rate of 2,500 square yards per hour, without loss of temperature in transmission. The effect is the immediate penetration of the tar into the strata of road material to a depth of two inches in the case of a good hard surface road, and three or four inches where the formation is of a loose, flinty nature. As the tar cools and hardens in the interstices, it binds the road to an extent that renders it dustless and mudless, practically for a year. The operations were regarded with appreciative interest by the spectators already mentioned. The merits claimed for their process by Messrs. Robert Johnson and Company include the following:—

The spraying is automatic, both as regards sprinkling and brushing.

The distribution of tar is perfectly equal over the whole surface.

Owing to the speed at which the tar can be applied and brushed in, the roads need only be closed to traffic for a very short time.

Each machine takes the place of 50 workmen, working under the most favourable conditions.

Two coats, applied under favourable circumstances, and when the roads are in good condition, will last 12 months, and the saving in the cost of scavenging and watering, will more than cover the cost of roads which have now to be watered daily.

The roads, being rendered watertight by this process, offer less friction to traffic passing over, consequently adding materially to the life of the road.

## ANSWERS TO CORRESPONDENTS.

## The Abbey of Strade, Co. Mayo.

**A. D.**—Apropos of the proposal to erect a church at Strade as a memorial to the late Michael Davitt, the following particulars from Ware's *Antiquities of Ireland* may be of interest:—

"Friary of Strade, near Athlethan.—Jordan de Exon, Lord of Athlethan, or, as some say, son of Jordan, at the request of Basilia, his wife, daughter of Miler de Bermingham, gave this place to the Friars Preachers where before inhabited the Friars Minors, as we find in the Register of the Convent of Predicants of Athenry. The Dominicans first seated themselves here in the year 1252, says the Chronicle of that Order. From this English family of the Jordans Exonia, which was heretofore in great esteem in those parts, many are at this day after the Irish way called MacJordan."

The name of MacJordan is now, however, we believe, not common in the vicinity; that of Jordan or D'Exter Jordan now is, on the contrary, that of a well-known Co. Mayo family of the present day.—Ed. I.B.

**Pettigo.**—Tenders were received for alterations and improvements to premises at Pettigo for D. J. Flood, Esq. Mr. J. P. McGrath, Commercial Buildings, Foyle-street, Londonderry, is the architect.

**Whitehead.**—The Midland Railway Company are about to erect at Whitehead four workmen's dwelling-houses and stables for four horses. Drawings and specifications can be seen at the engineer's office, York Road Terminus. Tenders close 10 a.m., Wednesday, 24th, 1906.

## REVIEWS.

"**Practical Stencil Work,**" by Frederick Scott-Mitchell, Lecturer on Decorations to the City and Guilds of London Institute and the London County Council.—This, the second volume issued in the "Decorator" series of practical handbooks, deals with the designing and cutting of stencils and the execution of stencil work for all purposes. It is a subject of great importance to painters and decorators, and is of considerable interest to that growing section of the public which is appreciative of beauty in interior decoration. Stencilling as a branch of decorative art has in recent years made great progress. This is due to the fact that ornament executed by means of stencils is not only comparatively cheap, but that it may, with skilful treatment, combine simplicity, beauty, and effectiveness. The increased use, also, of plain wall surfaces has been an important element in the development of stencilling. Mr. Mitchell's book is, therefore, most opportune, and will prove of great service to decorators. The subject is treated in a practical and comprehensive fashion, as is to be expected from the fact that the author writes from actual experience of the subject extending over many years. The book is illustrated with a great number of designs, ranging from the simplest to the most elaborate, and every operation is described step by step from the actual designing, or choosing a design, and the cutting of the stencil itself to its execution on the surface it is intended to occupy. The publishers are The Trade Papers Publishing Co., Ltd., 365 Birkbeck Bank Chambers, High Holborn, London, W.C., and the price of the book is 3s.

"**Fire Tests with Floors.**"—No. 114 of the "Red Books" of the British Fire Prevention Committee.—This publication deals with the fire test of a floor of reinforced concrete made by the Patent Indented Steel Bar Co., Ltd., Queen Anne's Chambers, Westminster, London. The total thickness of the floor was 6 in., and it was made of concrete composed of  $4\frac{1}{2}$  parts of blast furnace slag,  $1\frac{1}{2}$  parts of sand, and 1 part of Portland cement of the brand known as "Ferrocrete." It was reinforced with indented steel bars, and its area was 410 ft. super-divided into 3 equal bays. After setting, the floor was loaded with stock bricks equal to a distributed load of 280 lbs. per square foot. The test was undertaken on the 25th of last July, and lasted for 4 hours, during which the temperature was raised to 1,800 degrees Fahrenheit. The gas was then turned off, and water was applied to the floor for five minutes through two nozzles supplied from a steam engine. The result of this exceedingly severe test was highly complimentary to the Indented Steel Bar Company's system of reinforced concrete. Although so heavily loaded, and subjected to such a terrific temperature, the permanent set of the floor after removal of the load was only  $\frac{3}{4}$  in., and neither fire, smoke, nor water passed through the floor. The consequence was that the committee classified the floor as "Fully Protective." Full particulars, with illustrations, plans, &c., are given in the book, which is published at 2s. 6d. by The British Fire Prevention Committee, 1 Waterloo Place, Pall Mall, London.

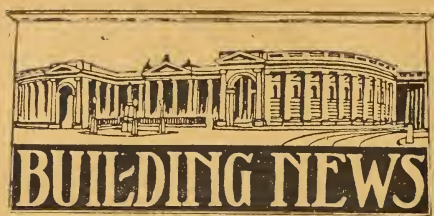
**Gillabey.**—Tenders will be received on 22nd October for building and completing two houses at Gillabey, in accordance with plans and specifications prepared by Messrs. W. H. Hill and Son, architects, 28 South Mall, Cork.

**Gorey.**—The Gorey Town Commissioners considered tenders for the erection of the new Town Hall. The following tenders were received:—H. Duncan, Gorey, £260; B. W. Webster, Gorey, £240 10s.; Martin Kavanagh, Gorey, £212 11s. 6d. The tender of Mr. Kavanagh was accepted.

**Murroe.**—The dedication of the splendid new church of Our Lady of the Holy Rosary at Murroe, Co. Limerick, has been performed by his Grace the Most Rev. Dr. Fennelly, Archbishop of Cashel. Mr. Joseph O'Malley, B.A., B.E., Limerick, was architect, and Mr. Thomas Williams, Borrisoleigh, contractor.

**Rathdrum.**—The Rathdrum District Council have accepted the tender of Mr. Alex. McGowan, contractor, Arklow, for the building of the new Anamoe Dispensary. The tender is £1,300. Mr. Geo. T. Moore, M.I.C.E., Foster-place, Dublin, is the architect.





**Armagh.**—Mr. Patrick McKenna's, Armagh, tender of £6,107 9s. has been accepted for the erection of the artisans' dwellings. The following also tendered:—John Fitzpatrick, Armagh, £6,434 8s. 8d.; Collen Bros., Portadown and Dublin, £7,126; D. P. Martin, Armagh, £7,198 6s.; Thos. Collen, Tandragee, £7,634 2s.; A. C. Simpson, Armagh, £7,753 17s. 8d.; McKee and McNally, Dungannon, £7,857. Plans and specifications prepared by Mr. F. Bergin, B.E., 39 Westmoreland-street, Dublin.

**Balla (Co. Mayo).**—A new church is to be built at Balla next year, from the designs of Messrs. Doolin, Butler, and Donnelly, of Dublin. The cost will probably be between £5,000 and £6,000.

**Balrothery.**—The Balrothery Rural District Council have made an Improvement Scheme in pursuance of the Labourers (Ireland) Acts, 1883 to 1896. The sections of the Rural District to which the scheme relates consist of the electoral divisions of Balbriggan, Ballyboghill, Balcadden, Clonmethan, Donabate, Garristown, Hollywood, Holmpatrick, Kilsallaghan, Kinsale, Lusk, Malahide, Rush, Skerries, Swords, and the estimated cost of the scheme is £35,200. Mr. Antony Scott, M.S.A., is the architect for the scheme.

**Ballyhaunis.**—St. Patrick's Church, Ballyhaunis, is now nearing completion. The design of the new church is by Messrs. William H. Byrne and Sons, Suffolk-street, Dublin. The church is 114 feet long, with a total width of 71 feet. The height from ground to apex of gable is 60 feet. The style of architecture is Gothic. The component parts of the church are sanctuary, nave, aisles, porches, and heating chamber. Between the nave and the aisles are finely moulded arches supported on pillars of polished red granite, with bases and capitals of grey granite. A richly-moulded arch separates the sanctuary and the nave, and is supported on polished granite shafts with beautifully carved and moulded capitals and bases, the latter resting on corbels of grey granite with limestone sub-bases. The chancel arch springs from clusters of polished red granite columns with Bath stone capitals and anulets. Clustered trefoil windows in the celestary and tracery windows in the gable light the nave; double lancet windows, with cusped heads, light the aisles. The roof of the nave is supported on framed trusses. These rest on wall shafts, with moulded bases and caps moulded and carved. The sanctuary roof is similarly supported, while the aisles have No. 14 trusses as support. The bell tower, when complete with spire, will be 173 feet high. The limestone used in the building has been procured at Hazelhill quarry, and is of an exceptionally fine quality. Mr. John C. Fitzmaurice is the contractor.

**Bandon.**—The Board of Public Works are about to erect a new Post Office at Bandon, and tenders have been invited.

**Bangor.**—Mr. John Russell, C.E., 22 Waring-st., Belfast, has been instructed by Lord Bangor to prepare plans, sections, and specifications for making and completing three roads at Bangor. Tenders close 20th October.

**Cavan.**—The L.G.B. will hold an inquiry on the 25th inst. into the application of the Cavan Urban District Council for loans of (1) £4,500 for the purposes of erecting a Town Hall and making a new street; and (2) £500 for bridging over the river at the egg market.

**Cork.**—The new Town Hall for Cork has recently been opened. The hall was built within a period of two years for a Town Hall for the citizens. The contract was placed in the hands of Mr. John Delaney, builder, who opened the ground for the building in February, 1905, and it is now completed. The plans were prepared by Mr. J. F. Delaney, the city engineer. The main entrance to the new Hall is through the doorway at the back of the vestibule of the Municipal Buildings. From the latter one first steps into a crush or ante-hall, 9 ft. wide, which is lighted with a flat roof overhead. From the right and left of the crush hall, long, spacious corridors spring, and flank the main hall, extending from one end of the building to the other. Off the corridor on the left, or eastern side, accessory accommodation is provided, and this comprises ladies' and gentleman's retiring rooms, special committee

or conference rooms, which may be used for small dining parties, and also a large kitchen, which would be very useful for suppers on the occasion of balls or dances. The eastern corridor is very suitably lighted in the centre of its length by glazed screens. There is also an easy seat running along this corridor for sitting out or retiring parties on the occasion of dances. A number of doors communicate between the corridors and the main hall. The organ is seated at a height of some 15 feet from the main floor, and shows out prominently through the proscenium opening from the other end of the hall. Under the organ are neatly finished retiring rooms for performers, ladies and gentlemen, and from these retiring rooms access can be gained to the hall proper by means of an elaborately constructed staircase. The upper tube of the organ almost finds contact with the ceiling. The length of the building is about 120 feet, of which 85 feet is given to the auditorium proper, and the rest is occupied by the stage and organ gallery. A flat stage or platform runs from the wings of the proscenium for about 12 feet, and then it rises in tiers of seats, suitably constructed to accommodate performers, and these tiers rake back gracefully close upon the organ. The ceiling, which is about 50 feet high, is of wrought pitch pine, interspersed with mouldings forming in rich panels, and it is covered all round to an extent of 7 feet along the side of the interior. Great care was taken by the City Engineer with regard to the ventilation of the hall, which is arranged by perforated panels in the ceiling, and carried through external ventilators in the roof. The hall is lighted by twelve large mullioned windows, surrounded with stucco architraves, which spring from decorative and beautifully moulded triglyphs. The hall is also ventilated through those windows by means of casement sashes, on which are ornate glass figures. The proscenium has been specially treated by the City Engineer. The interior of the hall is surrounded by a gallery, supported on wrought and moulded columns, and approach can be had to it from the stairs on the vestibule of the Municipal Buildings.

The concluding ceremony in connection with the consecration of St. Vincent's Church, Sunday's Well, Cork, has now taken place.

**Co. Down.**—A new parochial hall, built on the Elizabethan style, was opened at Annahilt, Co. Down, by the Right Rev. Dr. Welland. The structure cost £490.

**Co. Dublin.**—Rathdown Rural District Council are about to provide 64 labourers' cottages, according to the Provisional Order of Local Government Board, dated 3rd October, 1906.

The Board of Guardians of the above Union will, at their meeting on 24th October, receive tenders for keeping in order for a period of one, two, or three years, as may be decided, the exterior slating of all the Workhouse buildings, repairs of chimneys, etc.; also eave gutters and down-pipes.

**Dublin.**—Mr. George Langley, Ringsend-road, Dublin, is building a villa facing the Masonic School, Ballsbridge. Mr. J. Hampden Shaw, Westmoreland-street, is the architect.

Mr. Geo. J. Crampton, Hammersmith Works, Pembroke-road is making additions to Finglas Rectory for the Church Representative Body, according to plans and specifications prepared by Mr. J. F. Fuller, F.S.A., 179 Great Brunswick-street.

Mr. Samuel Worthington, Orwell-road, Rathgar, is engaged in making alterations to the premises of Mr. Marcus Moses, Eustace-street, according to the designs and specification of Mr. J. Hampden Shaw, Westmoreland-street, preparatory to the Bovril Co. taking them over.

The Royal Dublin Society are erecting a large number of permanent stalls at Ballsbridge. The divisions are of concrete with pitch pine posts. A few were constructed for the last Horse Show, as samples, and were highly approved of by horse owners. They are being erected by the Society's men from the designs of Messrs. McCarthy and Anderson, 39 Westmoreland-street.

Mr. Pemberton, Ballybrack, is at present converting three houses in Baggot-street into shops, according to the designs of Mr. J. F. Fuller, F.S.A., 179 Great Brunswick-street.

We notice Messrs T. Connolly and Son, Upper Dominick-street, are erecting a number of comfortable two-storey houses close to the railway at Sandymount.

It has been decided that a rate of 1d. in the pound be levied on the whole North Union District, in order to provide for the erection and maintenance of a sanatorium for consumptives for the City and County of Dublin, the rate to be levied in conjunction with the other sanitary bodies of the city and county of Dublin.

The conference of representatives of the City and County of Dublin met at the offices of the Public Health Committee, Cork Hill, on Tuesday week. The meeting was of opinion that a sanatorium for the treatment of consumption ought to be established by the combined authorities of the City and County of Dublin. In reference to the report made

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by the conference, and which has been forwarded for the consideration of the various authorities, letters have been received from Kingstown Urban District Council, North and South Dublin Rural District Councils, Balrothery and Celbridge Rural District Councils, agreeing to the formation of a joint board and the levying of a rate of 1d. in the £ in their respective districts. The conference expressed the hope that the following authorities would join in the scheme—Urban District Councils of Pembroke, Rathmines, and Blackrock, and the Rural District Councils of Dalkey, Killybeg, and Rathdown. It was announced that all the urban and rural sanitary authorities of the City and County of Cork had combined to form a sanatorium, and one was being also established in Belfast.

The new Chapel-of-Ease, in connection with Leeson Park Church, that has been erected at Ranelagh, was dedicated by his Grace the Archbishop of Dublin. The new church is about 45 feet long by 27 feet wide, with chancel 17 feet wide by 6 feet deep. The framework of the building is covered on the outside with galvanised iron with unusually small corrugations. The roof is covered with galvanised iron, Italian pattern sheets, and inodorously felt interlining has been introduced throughout. The entrance porch is a neat addition, and has a pair of Gothic outer doors, the inner doors being covered with red baize, and opening outwards. There is a very neat dado of Oregon pine up to the level of the sills of the windows; the remainder of the side walls is covered with compo-boarding, coloured with Duresco. The ceiling is counter-sheathed with match-boarding, varnished, the general framework being slightly stained and varnished. The chancel arch is very neatly finished. All the windows have Gothic heads, and part of the windows open inwards for ventilation, and are all glazed with tinted lead lights. The church is heated by low pressure hot water pipes, which run round the outside walls of the building, and are concealed where they cross the chancel. The building is lighted with electric light, with six pendants of three lights each, and one five light being hung in front of the chancel, and arranged so that the lights can be controlled at different points. There are two very neat ventilators in the roof, so that ample heating, lighting, and ventilation have been provided for. The pews are arranged up each side, with centre aisle, and seating accommodation is afforded for 230 people. Messrs. Kennan and Sons, Ltd., were entrusted with the carrying out of the work, including the heating and lighting, and Mr. George Metcalfe acted as supervising architect on behalf of the vestry.

The proposed Royal Dublin Fusiliers' memorial, to be erected as an entrance to St. Stephen's Green Park, at the top of Grafton-street, takes the form of a triumphal arch, the general proportions of the Arch of Titus being followed in the design. The fact that Sir Thomas Drew has kindly given his help on the Committee as consulting architect, and that Mr. Howard Pentland, R.H., whose services were kindly lent by the Board of Works, has been responsible for the design, should be a sufficient guarantee that it will be in thorough accord with artistic ideas. The memorial will be executed in Irish granite.

**Durrow.**—A cut-stone tracery memorial window, to be filled with stained glass is being erected in the chancel of Durrow Church for Lord Ashbrook by Messrs. C. W. Harrison and Sons, 178 Great Brunswick-street, according to the designs of Mr. J. Franklin Fuller, F.S.A., 179 Great Brunswick-street.

**Kingstown.**—Mr. L. Monks is building a house in Sandycove-avenue, West, according to the designs of Mr. Geo. T. Moore, Foster-place, Dublin, who has also prepared the plans for two villas now being erected on the Albert-road by the same contractor for Mr. A. K. McDonald. £800 is the tender for the first-named building.

**Lisburn.**—Tenders are invited for the construction of three streets in Lisburn, according to the plans and specifications of Mr. Geo. H. Sands, engineer, Courthouse, Lisburn. Tenders close October 25th.

Messrs. Young and MacKenzie, Scottish Provident Buildings, Belfast, have prepared plans and specifications for additions to the Café of the Temperance Institute. Tenders close October 25th.

**Mullingar.**—A contract for alterations and additions to Levington Park, for Charles Levinge, Esq., J.P., is about to be offered for tender. Messrs. Doolin, Butler and Donnelly, Dublin, are the architects.

**Nenagh.**—The new church of Our Lady of the Rosary was consecrated on Sunday last. The foundation stone was laid in the summer of 1893. The church is built from the designs of the late Mr. Doolin (Doolin, Butler and Donnelly, Dublin, architects). It is based upon the principle of the severe but beautiful and dignified type of early English Gothic art of the 13th century, beloved of the Cistercian Order, and developed and amplified in Ireland after its introduction from England into this country. Throughout the whole of the ancient Abbeys of this country

of that period, and more particularly in the eastern counties, we see this beautiful style adopted, and well suited is it to our hard and unkindly Irish limestone, which does not readily lend itself to elaborate and fanciful detail and ornamentation. The simple pointed lancet windows, graceful gables, and well-proportioned lofty interiors are its most distinguishing characteristics. The contract was carried out by Messrs. John Sisk and Sons, Cork. The five-light lancet window is the work of Messrs. Earley and Co., of Camden-street, Dublin. Mr. Edmund Sharpe was responsible for the high altar in marble and one of the side altars, the other being the work of Messrs. Pearse. The capitals of the nave arcade and the bosses of the arches were carved by Mr. J. A. O'Connell, of Cork. The wrought-iron work in the church is the work of Mr. John Fagan. The building is heated on the combined hot air and hot water system by Messrs. Musgrave and Co., Belfast. Messrs. Sisk's contract was £24,000 for the shell of the building, and the total cost £40,000.

**Omagh.**—The new County Club-house is progressing satisfactorily towards completion.

**Palace East (Co. Wexford).**—Extensive alterations, including new hunting stables, are about to be carried out at Palace, the residence of Captain J. S. Dawson. Messrs. Doolin, Butler and Donnelly, Dublin, are the architects.

**Trim.**—The L.G.B. have appointed Mr. Arthur Taylor, 11 Conquer Hill, Clontarf, Dublin, as arbitrator in connection with the new waterworks scheme. Mr. Taylor will hold the inquiry at the Town Hall, Trim, on the 23rd inst.

**Tullamore.**—A large and important church was dedicated on Sunday week by the Most Rev. Dr. Gaughran, Bishop of Meath, at Tullamore. The church, which has but recently been completed, was designed by the late Mr. William Hague, and built under the supervision of Mr. T. F. Macnamara, of Dublin. The building, which is Gothic, is about 200 feet from the ground, 172 feet is the length from outside east wall to the west door, the nave 36 feet wide, side aisles 18 feet wide each. The sanctuary has on each side two chapels, behind one of which is the sacristy, and near the other a well-lighted room reserved for the nuns who have easy access from their convent. The chancel arch rests on two columns and smaller pillars of Galway granite. Over the altars the groined roof is of fibrous plaster, while that of the centre is of pitch pine. The windows contain cathedral glass, and perfection appears to have been reached in the ventilation, heating, and lighting, the last being by means of electric installation. At the west end is the organ, an instrument the look of which is in harmony with the whole edifice, and was supplied by Telford, of Dublin. The High Altar is a magnificent proof of the sculptor's art. It is of Sicilian marble with panels of Carara and shafts of Cork and Connemara marble, the artists being Messrs. Malone, also of Dublin. There are already also stained glass windows and the Stations, in oils. The stone materials were taken from the local quarries, and, as far as possible, local tradesmen and labourers were employed throughout. For the dedication, the new R.C. Bishop of Meath, Dr. Gaughran, attended, and he was assisted by Dr. Hoare, of Ardagh.

**Wexford.**—A conference of delegates from each of the representative boards in the county was held in the Town Hall, Wexford, under the presidency of the Mayor (Mr. J. J. Stafford, J.P.), for the purpose of devising some means to stamp out consumption in the county. It was decided to request the Government to give a capitation grant towards the proposed sanatorium, similar to that given for lunatic asylums. The death-rate from consumption was stated to be on the increase in Wexford, 317 people having died from the disease in 1904, as against 200 odd in 1902.

The Wexford Corporation have decided to proceed as soon as possible with the erection of a new Town Hall, at a cost of between £6,000 and £7,000.

Mr. J. J. Stafford, the Mayor of Wexford, has almost completed two new houses in connection with his own business premises in the Main street.

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# ENGINEERING SECTION.

## ITEMS.

At last the vexed question of tramways across the London Bridges has been definitely decided, and the Embankment bears a resemblance to being in a state of siege. A double line of tram rails is being laid in proximity to the river-side pavement, and the trees which, after much careful tending, have become of some beauty, are being lopped and the roots damaged by the operations. Westminster Bridge is torn up, and, in addition to the motor bus, the electric tram will soon jar and rattle past the Houses of Parliament in the ears of our legislators. To those who know their London, the new service will be a blot on the finest promenade in the city, but nowadays the claims of labour are paramount, and for them all other rights and privileges must make way.

\* \* \* \*

The Channel tunnel scheme, of which we recently gave some particulars, and the Behring Straits tunnel scheme, which is under consideration to link Asia with America, have led engineers to discuss the feasibility of a tunnel under the Straits of Gibraltar. These works, if carried out, would link up the Continents of Europe, Asia, Africa, and America, and afford a rapid means of transit which would undoubtedly prove of the greatest benefit to the United Kingdom from a commercial point of view. Nor would the fruition of the schemes materially affect the shipping interest under existing conditions, for seaborne goods, owing to the relatively small cost of transport, would still remain in the majority, and British ships would still carry them. Splendid isolation is a watchword which sounds well, but does not bear analytical examination in these times of severe competition, and the question of speed of transit bears considerably on the opening up of new markets. None of the schemes, in these days of engineering enterprise, can be considered impracticable, nor would the cost be prohibitive when the effects on the advance of civilisation are taken into account.

\* \* \* \*

An important point with regard to public health is the necessity for thoroughly cleansing public-houses, and it is one to which attention is but very seldom called. The increasing ravages of that dread disease, consumption, in Ireland have caused the utmost alarm, and laudable schemes for the erection of sanatoria are being brought forward and considered by various public Boards throughout the country. Steps are also being taken to prevent, as far as possible, the too prevalent habit of promiscuous expectoration, which is seen in excess in this country. But the small, ill-kept, and unventilated public-houses, of which the towns and villages are full, are undoubtedly a far more serious menace to public health, and the attention of urban and rural officials should be called to the condition of these centres of disease-dissemination, with the object of improving them, and bringing them under the elementary laws of hygiene. Our contemporary, "The Sanitary Record," points out the evils of the small public bar, with its stuffy atmosphere, reeking of tobacco smoke and alcoholic drinks, with floors upon which phisical people may expectorate with impunity, all pregnant with danger to the employés of the place and to its habitués. The usual form of spittoon, with its small hole, seldom receives the expectoration direct, and such as reaches this article is principally deposited on the sloping top, depending on various conditions for the period it takes to get to the sawdust or water contained therein. But it is common knowledge that in the small Irish public-houses even these antiquated articles are not considered necessary, and the timber floor, occasionally covered with sawdust, is found by the clientele to be the readiest receptacle. It can be easily imagined what the condition of such premises becomes after a short period, and what dangers to the general public must ensue if the impregnated sawdust be not burnt, but cast merely on a dust-heap, from which the

disease germs are blown hither and thither. It would be a convincing proof of the sincerity of Irish local boards in their desire to stay the evils of consumption, if they addressed themselves to the legalising of regulations for the proper cleansing of the public-houses in their district. The floors should be daily sprinkled with disinfectant, and the benches, counters, and walls thoroughly cleansed with a germicide. We would even go farther, and make it compulsory that public bars should be erected and furnished under the hygienic conditions of a hospital, all the materials being of as non-absorbent character as possible, so that the premises could be thoroughly and frequently washed out from floor to ceiling. Dwellers in towns, where the hotels and public-houses are kept clean and attractive, may think such measures unnecessary, but the small Irish "pub." and its appurtenances are often in such a revolting condition towards closing time as to seriously affect the health of those who are employed in them and those who use them. To sit for hours consuming indifferent whiskey in a stuffy atmosphere is itself a preparation for disease reception, and the phisical conditions therein undoubtedly have much to say to the ever-growing returns of deaths from the "White Man's Scourge" in Ireland.

\* \* \* \*

During the month of August the Engineering Standards Committee has issued three reports, No. 24, 28, and 31, on the Material used in the Construction of Railway rolling Stock; nuts, boltheads and spanners; and steel conduits for electrical wiring, the net cost being 10s. 6d., 2s. 6d., and 2s. 6d. respectively.

\* \* \* \*

The report on the material used in the construction of railway rolling stock (No. 24), is one of the most important of the reports yet issued by the Committee, covering, as it does, nineteen specifications for tyres, axles, springs (laminated volute and helical), copper plates, copper rods, copper and brass tubes, steel forgings, blooms, castings, steel for locomotive boiler and frame plates, and steel for carriage and wagon underframes. In order to meet the needs of those engineers whose practice it is not to specify any chemical requirements, a duplicate specification containing no analysis clause has been provided, thus increasing the number to twenty-seven specifications, together with an appendix of forms of British Standard test pieces. The subject of the standardisation of locomotives was first raised at a meeting of the main Committee, on January 14th, 1902, when Sir John Wolfe Barry recorded interviews he had had with Lord George Hamilton, and other officials of the India Office with regard to this subject, and it was agreed that evidence should be collected. Subsequently a Sectional Committee on Locomotives was formed, under the chairmanship of Sir Douglas Fox. At the first meeting of this Sectional Committee three sub-committees were formed on locomotive steel plates; tyres, axles and springs; and copper and its alloys; the first two under the chairmanship of Mr. W. Lorimer, the third under Mr. W. Dean, who was succeeded by Mr. J. F. McIntosh. The Sectional Committee places on record its appreciation of the services rendered by the Association of Railway Locomotive Engineers during the inquiry.

\* \* \* \*

As might be anticipated in such an important matter, most divergent views had to be reconciled, and this was only rendered possible by accepting the view that the standard specifications will be considered from time to time as occasion requires. The Sectional Committee on railway rolling stock underframes was appointed by the main Committee on July 16th, 1901, and drew up a list of standard sections in conjunction with the Sectional Committee on sections used in shipbuilding, and that on bridges and general building construction. The specifications with



which, through lack of space, we cannot deal in detail, have the merit of clearness and conciseness, and the paragraphs are generally headed as follows:—Quality of material, freedom from defects, branding, mechanical tests, tensile test, cold bend test, fatigue test, tensile and cold bend or fatigue tests, annealing or oil hardening, inspection and testing facilities. In addition, falling weight tests are included in the specifications for tyres and axles, and cambering and compression tests for springs. The whole report is one that will be of great utility to manufacturers and railway engineers, and the Sectional Committees are to be congratulated on the careful and clear method in which the specifications are drafted.

\* \* \* \*

Report No. 28, on British standard nuts, bolt-heads and spanners, should prove of great service, as a lack of standardisation in these materials and tools has, in the past, led to much confusion. The question of standardising lock nuts was discussed by the main Committee at a meeting held in March, 1905, in conjunction with a letter received from Messrs. Thwaites Bros., Ltd., of Bradford, calling attention to the disparity of lock nuts manufactured in Great Britain. Manufacturers were approached and a large amount of information collected, from which it became apparent that some recommendations on nuts, bolt-heads and spanners might be made with advantage. It was considered desirable that the standard sizes, recommended by the Committee, should depart as little as possible from the sizes at present in general use in this country, and the recommendations were, therefore, based on the information referred to above. The Committee has drawn up schedules representing a system practically interchangeable with the existing Whitworth standards, and one which, it is thought, will prove more satisfactory owing to its greater simplicity. The tables have been compiled for bright nuts and bolt-heads, black nuts and bolt-heads, spanners and castle nuts. The tables with regard to nuts give the maximum and minimum width across flats, the width across corners, and the maximum and minimum thickness. The tables for spanners contain nine dimensions, to two places of decimals, in accordance with the diagrams of single and double-ended spanners included in the report. If these standards be adopted it should serve to eliminate that curious coincidence by which a spanner is nearly always just too small or too large for the nut.

\* \* \* \*

The British standard specification for steel conduits for electrical wiring (No. 31) will be of particular interest to electrical engineers, although we must confess that, in its dealing with this involved subject, the Committee has been unusually indulgent. No material is so open to abuse, and we regret that the scope has not been more restricted and clearly defined. The steel conduit still remains close joint, brazed, welded or solid drawn, screwed, plain, enamelled or galvanised, so the old familiar combinations remain unsettled, and a standard conduit, by which the purchaser may rely on obtaining the same article from different vendors, has not been decided upon. This we consider a grave defect, having regard to the present condition of the electrical trade, and one which we hope to see remedied. The tabulated appendix gives standard sizes for plain and screwed steel conduits before enamelling or galvanising, and thus far, if adopted, will afford some protection against an inferior article.

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### OUR SOUTHERN LETTER.

(FROM OUR CORRESPONDENT.)

#### Railways.

The Queenstown Urban District Council have held a special meeting and passed a resolution in favour of a proposed line of railway from Queenstown to Ballycotton. The engineer to the scheme, Mr. P. J. McAndrew, B.E., B.A., brought the matter before the Council and explained the scheme. The line would start by a junction with the Great Southern and Western Railway terminus through Queenstown and along the foreshore to East Ferry, cross the Ferry by an opening bridge along by Rostellan Castle to Aghada, then through Cloyne to Ballycotton. The total length of the line will be about 15 miles, gauge 5 ft. 3 in. It is proposed that the portion from Queenstown to East Ferry should be worked by electric power, supplied by the Queenstown branch of the Cork Electric Tramway Company, the remainder by steam or oil motive power.

The scheme is estimated to cost about £16,000, and the plans are to be prepared so as to have the Bill in Parliament next session. If this scheme is carried through, it should prove a great benefit to Queenstown, Cloyne, and Ballycotton.

The engineer states that most of the capital has already been promised.

#### Queenstown Waterworks.

The Queenstown Urban District Council have passed a resolution that an independent engineer be appointed to measure the dam and reservoir in connection with the Queenstown water supply, in order to discover if there is any explanation outside leakage of the mains and the dry season which would account for the shortage of water.

The engineers state the amount of water drawn from the reservoir daily amounts to about 300,000 gallons, and they consider that about 100,000 gallons of this is wasted.

The average daily of the watershed area is calculated at about 200,000 gallons per day. It is stated that during the dry season this has been reduced to 80,000 gallons.

The reservoir is calculated to hold 36,000,000 gallons. Of course, a good deal of the value of these figures would depend on the real amount of the water in the reservoir at the beginning of the dry season. The rainfall for the last two months has been very small. For instance, the rainfall for August was less than half the average, and up to the night of the 30th September the rainfall for that month was only one-sixth of the average.

#### General.

The engineer of the Macroom sewerage scheme reports that the work is making good progress, and informs the District Council that an additional loan of £600 will be required, bringing the total cost up to about £1,850.

The new premises of the Cork Harbour Commissioners have been formally opened. They have been designed by and executed by direct labour under the guidance of the Harbour Board Engineer, Mr. J. Price, M.I.C.E., at a total cost of £31,000. The plaster ceilings were designed and executed by Mr. J. Sisk, contractor, Cork, and reflect great credit on him and his workmen.

The new Town Hall has also been formally opened, the work being carried out from the designs of the City Engineer by Mr. John Delany, contractor, Cork, at an estimated cost of £5,300. Local labour and material was employed throughout.

The Hall adjoins the vestibule of the Municipal Buildings, and its total length is 120 feet, 35 feet of which is occupied by the organ and platform.

There is a gallery around the body of the hall, and corridors down each side, and retiring rooms, kitchen, and a small museum adjoining. The hall is 50 feet high, and the organ, which was presented by the Cork Exhibition Committee, occupies the back of the Platform behind an ornamental proscenium.

The walls throughout are plastered, and the ceiling is sheathed with wood, stained and varnished, and divided into panels.

The Mallow Urban District Council received five tenders for twelve workmen's dwellings, the lowest being for £1,280, and three tenders for alterations for the Town Hall, the lowest being £348. The accepted tender in each case was sent in by Mr. John O'Keeffe, contractor, Mallow.

## THE WATER SUPPLY OF THE CITY OF DUBLIN.\*

By M. A. MOYNIHAN, *Engineer in Charge of Dublin Corporation Waterworks.*

The recent decision of the Corporation to extend the Vartly Waterworks, at an estimated cost of £135,000, by increasing the reservoir area at Roundwood, suggests to me that a brief notice of the water-supply of Dublin, its history and its various developments, may not at present be out of place. Of all forms of municipal activity scarcely any can be considered of greater importance to the community than the providing of an adequate supply of pure water for domestic and public purposes. To-day the most urgent and most difficult problem that confronts the local authorities of London is this necessity. Liverpool, Manchester, Glasgow, and other large cities in Great Britain have been able to overcome the difficulty by reason of their natural advantages of situation. To Dublin, of Irish cities, belongs the honour of being the pioneer in undertaking a waterworks project on the lines that are universally followed in modern engineering practice, where at all possible.

### Dublin's Early Water Supply.

As is generally known, Dublin was for many centuries entirely dependent for its water-supply upon the old aqueduct that started from the weir on the River Dodder near Firhouse and Templeogue, and ended in a reservoir that probably occupied the site of the present City Basin, near Mount Brown. This artificial water-course is the oldest remnant of civic engineering that Dublin can show. It owed its existence to Maurice Fitzgerald, Lord Justiciary of Ireland, who, in the year 1244, addressed a writ to the Sheriff of Dublin, commanding him, without delay, to advise with the Mayor and citizens and to hold a court of inquiry as to the best and most convenient source whence water could be taken to the city at the cost of the citizens, compensation for any damage done being at the King's cost. Extensive building operations were in progress at the Castle, and it was stipulated that the royal fortress should obtain the necessary supply of water from the city conduit when constructed.

The work appears to have been finished before 1254; in that year, certainly, it was in full operation. In all essential respects this was the water course that still exists. Numerous references to it are to be found in the city archives, in old deeds, and in various chronicles. We know from these that the populace in general drew their water from open cisterns that were supplied by the conduit from the basin to the high pipe in High Street. Important bodies like the great monasteries of the Holy Trinity and of St. Saviour's—the latter of which stood on the site of the present Four Courts, and leading citizens who could afford to pay for the privilege, had private service pipes connecting with the conduit. These latter were not to exceed the thickness of a goose-quill, and the limit in the case of the monastic establishments was such a bore of pipe as could be stopped by a man's little finger—a sufficiently indefinite standard of measurement. One of these cisterns, as appears from the Doomsday book of the Corporation, was, in 1255, situated in High Street, opposite to the Tholsel and near the gate of the Convent of the Holy Trinity. Again, it is certain that in 1308 John le Dece, the greatest merchant and most noteworthy Mayor of Dublin recorded in the mediæval annals of the city, erected at the eastern end of High Street, opposite the Church of St. Michael (where the Synod House now stands), at his personal expense, a marble cistern for the benefit of the citizens, such, says Holinshed, as was never before seen there. An Indian ink sketch of this quaint structure is in the office of Ulster King-at-Arms. Much confusion regarding this public cistern has arisen from the vagueness of the allusions made by the old writers to the conduit and the high pipe of the city. They used the words indiscriminately, and frequently apply one or the other term to the vases of stone from which the people drew their water-supply for domestic purposes, and to the trough or conduits that conveyed the water from the main reservoir to what we would

now call the distributing cisterns. The earthen aqueduct was itself called "the Pipe," and the expression, the "Back of the Pipe," still indicates a portion of the water course between Dolphin's Barn and the City Basin. That there was a third public fountain near Newgate, at the west end of the Cornmarket, is, I think, made sufficiently clear by the description of the attack upon that important entrance into the city made by Silken Thomas, that wild-head Geraldine, in 1535, as quoted in *The Irish Quarterly Review* for December, 1863, page 968; "They burnt the new street (i.e., Thomas Street), planted a falcon right against the New Gate, and it discharged pearsed the gate, and kild an apprentice of Thomas Stephens, alderman, as he went to bring a basin of water from the high pipe which by reason the springs were dried up, was at that time drie." Here we have a characteristic example of the troubles that beset the investigator who submits the old chronicles to criticism. How could that hapless apprentice draw a basin of water from a dry fountain? And we know, moreover, from other authorities, that the drying up of the springs simply meant the cutting off of the water supply by the followers of young Fitzgerald. Again, a cannon-shot, fired from Thomas Street, could not, by any mishap, have hurt a person drawing water from either of the cisterns, the location of which, in the eastern end of High Street, is indicated so closely that we could almost map the sites to within a foot, even yet.

### Some Early Troubles.

The old water-course gave endless annoyance to its custodians. It had a bad habit of silting up with sand and gravel brought down by the Dodder when in spate. It burst its banks at the most inconvenient times. It had its banks burst for it at frequent intervals owing to the trespass of cattle, pigs, horses, and other domestic animals. Mill owners diverted it to their own use, and owing to the lax, rough-and-ready methods pursued by the Corporation, established vested interests. At a comparatively recent period the farmers along its route thought nothing of cutting the banks to irrigate their lands or provide water for their cattle in a dry summer. But it must be said that the Corporation never quite forgot the importance of maintaining the water-course in working order. From time to time regulations were made for its upkeep, penalties were imposed for its pollution, officers were appointed to superintend its management, and when occasion required, special cesses upon the citizens and all others interested were levied to provide the funds necessary for its repair or improvement. Some notion of the ideas regarding sanitation that prevailed as late as the eighteenth century may be gathered from the terms of an Act of Parliament passed in the reign of George I., in the year 1719, prohibiting the erection of any "House of Ease," or water-closet, as we would style it nowadays, over the water course within one mile of the city. In the thirteenth century leaden pipes were used to distribute the water, and, for long after, lead was the material employed for the purpose. As late as 1671 we have mention in the civic papers of expenditure upon such pipes. When wooden pipes first came to be used, one cannot say with any certainty. This much is made clear by the entries on the assembly roll, or minutes of the old Corporation, that ducts made of elm or pine, bored and jointed like the sections of an old-fashioned wooden pump, were in universal use about the middle of the eighteenth century. The substitution of metal mains on anything like a large scale did not take place until 1799, when the Corporation obtained an Act of Parliament authorising them to levy special water rates to meet the expense of the undertaking. In 1775 they had entered into a contract with the Grand Canal Co., whose scheme of constructing internal water-ways was highly approved and most generously financed by the Irish Parliament, to take and purchase the surplus water conveyed from the country. Subsequently a similar contract was entered into with the Royal Canal Co., and the basins at Portobello and Blessington Street, were constructed to

\* A paper read before the Engineering and Scientific Association on October 15th.



receive the supplies thus accruing for the service of the south and north sides of the city respectively. In 1806 a further contract for sixty years was concluded with the Grand Canal Co., and its expiry brings us down to the inception of the existing water supply system of Dublin.

As may have been gathered from what I have said, the ancient service from the city basins was not safeguarded by any of the precautions against dangerous pollution that modern science would consider rudimentary. It gradually came to be recognised that the water supply from the canals was ever liable to contamination. The boats, whether carrying passengers—fly-boats as they were called—or cattle, or cargoes of manure from the city scavenge yards to the country, were not manned by sanitarians. Their diluted bilge-water was the drinking water of Dublin. Time and again angry controversies arose and subsided, as epidemics of disease broke out and subsided in due course, concerning the quality of the water supply. But it was not until the Dublin Improvement Act came into force in 1851 that the now reformed Corporation was in a position to move. Upon its shoulders was the burden of a heavy debt, the inevitable consequence of two centuries of persistent maladministration—to use but a mild term. Accordingly, when projects of a new and pure water supply began to be spoken of and discussed, they were regarded as chimerical. The Canal Companies, and the various interests concerned with them, were perfectly sincere in their belief that the suggestion to dispense with their services as water purveyors to the city was nothing more than an idle menace, designed to extort better terms when the existing contract expired. Even amongst the more enlightened citizens, nine out of every ten took no pains to conceal their scepticism as to the possibility of carrying out any scheme of a further-reaching character than the securing of a less offensively impure supply from the canals. As the municipal project took definite shape, and was revealed as a scheme to obtain water from some new source that would be entirely unaffected by any vested interests, scepticism hardened into incredulity. But in the public life of the city at the time was one very strenuous man who could not be taught to spell the word "fail." He had behind him an honourable reputation, the influence wielded by a member of Parliament, and the support of the powerful journal that he owned. The citizens of Dublin have raised a noble monument to the memory of Sir John Gray. It was nobly earned, for to him is due the Vartrey supply of water to our city.

#### What the Canal was Like.

The canal water was insufficient in quantity, it was intermittent in delivery, and being drawn from a low-level head it could not be sent to the upper stories of houses, nor was its pressure adequate in the case of fire. A still worse defect was its bad quality. It was drawn directly from the canals into the settling basins, where matters in suspension were supposed to be deposited by gravitation, but it did not even undergo any process of filtration. When, as the outcome of a long controversy at home, and of protracted Parliamentary proceedings, Sir John Hawkshaw was, in 1860, appointed a Royal Commission—he being the only Commissioner—charged with the duty of inquiring into and reporting upon the condition of the existing water supply, the necessity for its improvement, and the best source from which such improved supply might be derived, some startling revelations were brought to life. The mains, it was found, abounded with various forms of animal and vegetable life. Dr. Apjohn, then Professor of Chemistry in Dublin University, reported that one of these growths was a membranous structure of a highly cellular nature having some resemblance to certain of the spongilla. "This latter," he added, "exhibited two appearances occurring on the sides of the basins and interior of the mains, partly as an incrustation or slight thickness, and partly as projecting growths of the size and nearly of the shape of the human fingers. These growths were recent, were of a greenish colour, and, seen through a lens, appeared studded over, particularly at the extremities, with low conical projections. The projections just described were penetrated by numerous maggots, which had the faculty of spinning threads like those of the spider, executed rapid

movement, and were capable of inflicting bites. When a mass of the mixed organic matters just described was placed in a basin of water putrefaction rapidly set in, and in twenty-four hours an insupportably offensive odour was evolved." Professor Donovan further reported on the spongilla: "When a fatty layer covers the surface of the fluid, the water acquires a turbid yellowish colour, the spongilla becomes of a blackish green hue, and emits a most offensive putrid animal odour, like that of the most putrid offals." This evidence was corroborated by medical men of the eminence of Sir Dominic Corrigan and Sir William Wilde. More striking still was the testimony of philanthropic clergymen like the Very Rev. Dr. Spratt, who declared their opinion that much of the drunkenness amongst the poorer classes in Dublin was due to the fact that the water of the ordinary city service was not potable, and that the people added spirits to correct what was described as its disgustingly mawkish taste. After hearing the evidence, Sir John Hawkshaw unhesitatingly adopted the view that the water supply from the canal was impure and otherwise unsatisfactory. It remained to determine the best source of an improved supply.

#### Rival Schemes.

Amongst the considerations that guided the eminent Commissioner was the advantage of having a high service water supply with sufficient pressure to cause it to flow into the upper stories of dwelling-houses and to be efficient for the extinction of fire. This meant that the future supply should be at some considerable distance from the city, and the sources of supply proposed for adoption were: (1) Lough Owel and Lough Sheelan; (2) the River Dodder; (3) the River Dargle and its catchments, and Upper and Lower Lough Bray; (4) the River Liffey; and (5) the River Vartrey. The first was rejected because the supply was inadequate in quantity, and the same reason was a fatal objection to the Dodder and Dargle projects. Moreover, the water was peaty. Four schemes were suggested for the utilisation of the Liffey, of which the Coyford scheme, by which the water would be taken from the river at a point below Sallins, nearly where the Great Southern and Western line crosses the stream, found most favour; all were subject to the objection that they involved heavy expenditure in the way of compensation to property owners. Having made an exhaustive investigation into the subject in all its bearings, Sir John Hawkshaw finally reported that the Vartrey scheme, which was first suggested by Mr. Richard Hassard, C.E., was the best though the most expensive. Though Parliamentary opposition was still kept up by interested parties, Sir John Gray and his friends overbore it, and on the 21st of July, 1861, the Dublin Corporation Water Bill received the royal assent.

The necessary powers having been thus obtained, the work was started on the 10th November, 1862, on which day the Earl of Carlisle, then Lord Lieutenant of Ireland, laid the first stone of the Stillorgan service reservoir, and about the same time the making of the great embankment at Roundwood was commenced, which was to transform the lonely pastoral valley of the Vartrey into that noble lake, from which not only the citizens of Dublin, but those of Bray and Kingstown—in a word, all the townships and suburbs, with the exception of Rathinnes, derive that pure and health-giving supply of water which has practically remade our city, and, with the aid of medical and sanitary science, put an end to those periodical epidemics which were in previous times considered inevitable.

#### The Works at Roundwood.

This embankment at its greatest depth is sixty-six feet. It is 1,640 feet long, 380 feet wide at its greatest width, and is 28 feet wide at the top, along which is carried the public road that had hitherto passed along the bottom of the valley. The inner, or up-stream slope of the embankment is three to one, and is pitched with stone on edge eighteen inches thick at the top to nine inches thick at the bottom, laid on two feet thick of broken stone. The outer slope is two-and-a-half to one.

The total cubic contents of the embankment amount to 320,000 yards. In the centre there is a puddle wall six feet wide at the top and eighteen feet wide at the level of

the old river bed, which is the greatest depth. It is carried the whole length of the trench and well down into the solid rock at the bottom of the embankment. The material at either side of the puddle is of clay well punned, ten feet wide, and worked in layers of one foot depth. At the eastern end of the embankment is a bye-wash 300 feet long, the level of which is 692 45 O.D., and six feet below the top of the dam.

The sill of this weir is formed of granite blocks, and the apron is of rubble stone in concrete. The overflow from this bye-wash is carried round by the eastern side of the works and discharges into the old Vartry river course immediately below the filter beds. It had to be cut out of the solid rock to such a depth as would prevent the possibility of the water overflowing and damaging the filter beds. It was axed very severely after the great rainfall of August, 1905, and then proved the sound judgment and engineering skill of those who designed it.

While the embankment was being made it was, of course, necessary to have some provision made for the flow of the river until such time as the works would be completed, and this was arranged for by a tunnel through which the water would pass in the meanwhile. As the pipes which were to convey the water from the reservoir to the filtering beds were to be carried through the tunnel, precautions had to be taken so that it could be staunched thoroughly when the time was ripe for impounding the water, consequently it was cut through the solid rock fourteen feet wide, and arched over with Ashlar stonework, the height being the same as the width, and through it were carried a 33-inch and a 48-inch cast-iron pipe.

When the embankment was finished and the bye-wash ready, a plug of brickwork was built in the tunnel 38 feet thick, built of best fire-brick set in cement and keyed into a recess out in the solid rock. This 38 feet of plugging, comprised of ordinary fire-brick, suddenly changed the course of the old Vartry. After countless ages it had its course stopped, and instead of meandering through brake, glen, and meadow on its sparkling journey to Wicklow Bay, it must now conceal itself in an iron dungeon to serve the needs of the worthy Dublin citizens.

The eduction tower is built immediately opposite the tunnel. Three 24-inch valves, with bell mouths, are placed on pipes laid through the walls of this tower. The first 10 feet, the second 20 feet, and the third, 30 feet below top water level, in this way allowing of water to be drawn off at different levels, and should it be necessary to obtain water from a lower level than the 30 feet level, this can be done by opening the 33-inch valve between the 48-inch pipe and the 33-inch pipe in the valve chamber, to which I shall refer later.

(To be concluded.)

The Yorkshire Hennebique Contracting Company, Ltd., of Leeds, were the contractors for the Ferro-Concrete Viaduct, at Waterford, a description of which appeared in our last issue.

## ENGINEERING NEWS.

**Birr.**—The Birr sewerage scheme is progressing satisfactorily, and, it is expected, will be completed by the beginning of the new year. The work consists of a tunnel, 2,000 ft. long, some miles of sewers, flash tanks and disposal works. Mr. Hegarty, Ballymena, is the contractor, and Mr. Bergin, B.E., 36 Westmoreland-street, Dublin, is the engineer.

**Dublin.**—Extensive works are going on in the South Dublin Union in the erection of new boiler houses, boilers, and steam-piping connected therewith, to supply all the various laundries, hospitals, and cooking arrangements in connection with that very large block of buildings. The engineer and architect is Mr. J. H. Ryan, M.Inst.C.E., 22 Nassau-street, and the contractors for the buildings are Messrs. J. and P. Good, Great Brunswick-street, while Messrs. Ross and Walpole, North Wall, are responsible for the boilers and steam-piping.

**Dalkey.**—The tender of Messrs. Pooley and Co. has been accepted for the erection of a 2½ ton weighing machine for the Dalkey Urban Council.

**Foxrock.**—The Foxrock drainage works were started on the 1st inst. Mr. P. Dowd, Drury-street, is the contractor, and Mr. P. H. McCarthy, B.E., of Westmoreland-street, the engineer.

**Londonderry.**—The above Council received tenders for carrying out drainage works at Killea Graveyard, in Upper Liberties Electoral Division, according to plans and specification of Mr. M. A. Robinson, C.E., Richmond-street, Derry.

**Malahide.**—A scheme is now in course of progress to provide Malahide and district with a fresh water supply. Mr. Tuite is the engineer, and it is proposed to associate with him as consulting engineer a gentleman of large experience in sewage disposal works.

**Sixmilecross.**—The Great Northern Railway are about to erect a stationmaster's house at Sixmilecross Station. Plans and specifications can be seen at the office of Mr. W. H. Mills, Amiens-street, or at the District Engineer's office, Belfast. Tenders close at 10 a.m. Monday, November 5th, 1906.

## CONTRACT.

### NOTICE TO BUILDERS.

Tenders are invited from competent builders for the erection and completion of a **New Parish Church at Timoleague, Co. Cork**, according to the plans and specifications prepared by M. A. Hennessy, Architect, 74 South Mall, Cork.

Copies of the plans and specifications, and general conditions of the contract, may be seen daily at the Parochial House, Timoleague, or at the offices of the architect, South Mall, Cork.

Copies of the quantities can be had on application to the architect on payment of three guineas, which will be returned on receipt of a bona fide tender.

The lowest or any tender will not necessarily be accepted. Sealed tenders to be addressed to the undersigned on or before the 30th of October, 1906.

REV. PETER HILL, P.P.,

October 6th, 1906.

Timoleague.

P.S.—Timoleague is connected with Cork by rail; and by rail and road (about 2 miles) with the seaport of Courtmacsherry.

**ART WORKERS**  
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**ECCLESIASTICAL**  
AND DOMESTIC  
STAINED  
AND  
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**JAS. A. CAMPBELL & CO.**  
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STEPHEN'S-GREEN.  
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**DUBLIN**

All work made in Dublin and Delivered Free.

Designs, Estimates, and References on application.



## CONTRACT.

## THE NORTH DUBLIN RURAL DISTRICT.

## HOWTH SEWERAGE WORKS.

The North Dublin Rural District Council hereby invite Tenders for the construction of the necessary works for the sewerage of the Town of Howth, in the Electoral Division of Howth and County of Dublin, including Septic and Storage Tanks in the neighbourhood of the Howth Terminus of the Great Northern Railway of Ireland Company.

A Specification, Bill of Quantities, and form of Tender, with Maps and Plans of said proposed works, have been prepared by Mr. Patrick H. McCarthy, B.E., M. Inst. C.E.I., of 39 Westmoreland Street, Dublin, the engineer appointed by said District Council to carry out said works, giving in detail the nature of the proposed works. Copies of such Specification, Bill of Quantities, Form of Tender, Maps, and Plans, have been deposited with the Clerk of the said District Council at the office of the Clerk of the said District Council at North Brunswick Street, Dublin. The Maps and Plans can be inspected at said office during office hours, and a printed copy of said Specification, Bill of Quantities, and Form of Tender will be given to Contractors applying for same on payment to the said Clerk of a sum of £3 3s. od. for each set, which will be refunded on receipt of a bona fide Tender and the return of all documents furnished by the District Council.

The Tenders, which will be deemed only provisional in the first instance, should be deposited with the Clerk of the said District Council in sealed envelopes, endorsed "Tenders for Howth Sewerage Works," not later than 3 o'clock on Tuesday, the 13th day of November, 1906.

The Tenders will be opened at the meeting of the District Council, which will take place on Wednesday, the 14th day of November, 1906.

Each Contractor furnishing Tenders shall, along with such Tender, furnish the names and addresses of two solvent Sureties (to be approved of by said District Council), who will join the Contractor in a Bond for the due execution of the works.

The said District Council will not bind themselves to accept the lowest or any Tender, and will not, in any event, finally accept the Tender of any Contractor until after a Loan Inquiry, to be held by an Engineering Inspector of the Local Government Board for Ireland, shall have been concluded.

The Contractor shall provide that all materials used in the carrying out of the works shall be of Irish and, if possible, Dublin make, unless the Engineer of the District Council having charge of the works shall be of opinion, and shall so satisfy the District Council, that such materials cannot be procured in Ireland.

That said Contractors shall also provide that all labour employed in the carrying out of the works shall be Dublin and, as far as possible, local labour, unless the said Engineer shall satisfy the said District Council that such Dublin or local labour cannot be secured.

The Contract or Contracts to be entered into for carrying out of the works will contain stringent conditions binding the Contractor or Contractors to carry out the above conditions.

Dated this 12th day of October, 1906.

JOHN O'NEILL,

Clerk of said District Council.

Anthony R. Carroll, Solicitor for said District Council, 47 North Great George's Street, Dublin.

## CONTRACT.

## THE NORTH DUBLIN RURAL DISTRICT.

## HOWTH WATER SUPPLY.

The North Dublin Rural District Council hereby invite Tenders for the construction of the necessary Works for the Supply of Water for the Town of Howth, in the Electoral Division of Howth and County of Dublin, including a Reservoir at Balkill, in the Townland of Howth Demesne, and a Storage Reservoir adjoining Boggan Lane, in the Townland of Howth, in said Electoral Division.

A Specification, Bill of Quantities, and Form of Tender, with Maps and Plans of said proposed works, have been prepared by Messrs. Massard Tyrrell, Kaye-Parry, and Ross, the Engineers appointed by said District Council to carry out said works, giving in detail the nature of the proposed works. Copies of such Specification, Bill of Quantities, and Form of Tender, Maps and Plans have been deposited with the Clerk of the said District Council, at the office of the Clerk of the said District Council, at North Brunswick Street, Dublin. The Maps and Plans can be inspected at said office during office hours, and a printed copy of said Specification, Bill of Quantities, and form of Tender will be given to any Contractors applying for same on payment to the said Clerk of a sum of £3 3s. od. for each set, which will be refunded on receipt of a bona fide Tender and the return of all documents furnished by the District Council.

The Tenders, which will be deemed only as Provisional in the first instance, should be deposited with the Clerk of the said District Council in sealed envelopes, endorsed "Tender for Howth Water Works," not later than 3 o'clock on Tuesday, the 13th day of November, 1906.

The Tenders will be opened at the meeting of the District Council, which will take place on Wednesday, the 14th day of November, 1906.

Each Contractor furnishing Tenders shall, along with such Tenders, furnish the names and addresses of two solvent Sureties (to be approved of by said District Council), who will join the Contractor in a Bond for the due execution of the works.

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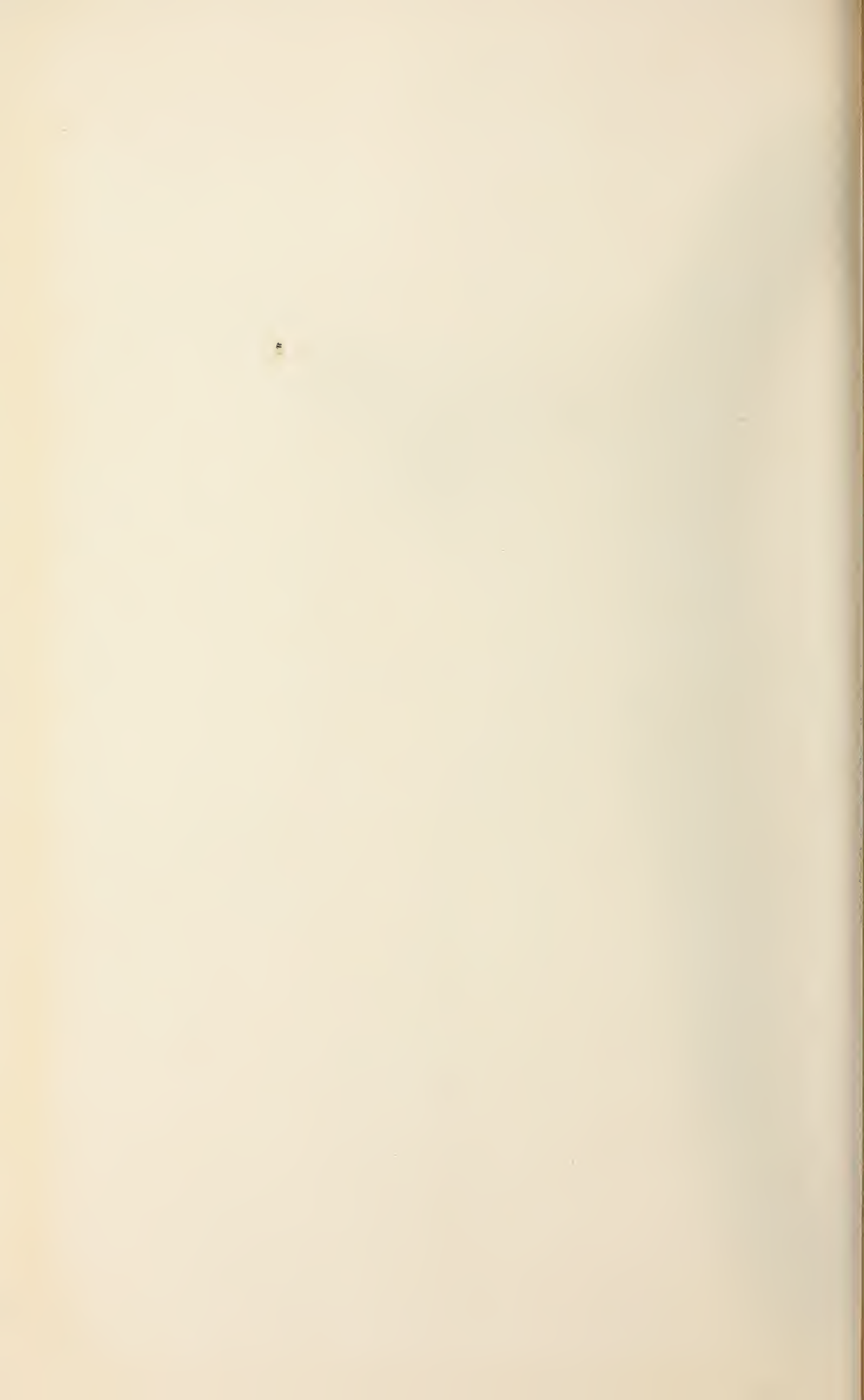
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M. A. HENNESSY, ARCHITECT.

**THE NEW CHURCH AT TIMOLEAGUE, CO. CORK,**  
For which tenders are at present being invited.





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No. 22—Vol. XLVIII.

HEAD OFFICE

NOVEMBER 3, 1906.

34 LOWER ABBEY ST.,  
DUBLIN

Price 1d.

## TOPICAL TOUCHES.

The Dean and Chapter of St. Paul's Cathedral, London, have appointed Mr. Mervyn Macartney as their consulting architect, in the place of Mr. Somers Clarke, who has resigned.

\* \* \* \* \*

On Tuesday last Mr. J. A. Gotch, F.R.I.B.A., of Kettering, lectured before the Architectural Association on "The English Renaissance." Mr. Gotch is one of the foremost living authorities on that period.

\* \* \* \* \*

We do not remember to have seen for many years so large an attendance as the bumper house which assembled to hear Mr. Gotch's most admirable paper on that subject of which he is such an acknowledged authority.

\* \* \* \* \*

Mr. W. M. Mitchell, who proposed the vote of thanks, welcomed Mr. Gotch as an old friend. Though it was his first visit to Ireland, he hoped it would not be the last.

\* \* \* \* \*

Mr. Gotch's kindness in coming all the way across the Channel, at this season of the year, specially to address the Association, places us all under an obligation to him for his sacrifice of time and comfort.

\* \* \* \* \*

We are glad to note that the Association is inaugurating a furniture fund, to make the library a little more cheery and cosy than it is at present, and we hope all who can do so will subscribe.

\* \* \* \* \*

The Congested Districts Board announce that they will shortly appoint a number of persons as land surveyors and clerks of works. In the case of the former, candidates selected after examination possessing engineering qualifications, and who have been for at least three years engaged at the practice of their profession, will be offered salaries commencing at £150, rising by annual increments of £6 to £180, with allowances.

\* \* \* \* \*

Candidates selected after examination without engineering qualifications, but who have had practical experience in land surveying, etc., as above, and those who have engineering qualifications, but who have not been engaged for three years in the practice of their profession, will be offered salaries commencing at £120, rising by annual increments of £6 to £150, with allowances.

\* \* \* \* \*

In the case of surveyors the pay is similar, and in this instance also they are divided into two classes.

\* \* \* \* \*

Experienced land surveyors who make a satisfactory examination will be offered a salary commencing at £120, with annual increments of £10 to £180, together with specified allowances.

\* \* \* \* \*

A limited number of candidates who have not had experience of field work, but who, from their examination, show that they possess sufficient theoretical knowledge to be readily trained as surveyors, will be offered salaries commencing at £90, rising by annual increments of £6 to £120.

Mr. Edwin Bradbury, M.R.I.A.I., has removed his offices to College Park Chambers, Nassau Street.

\* \* \* \* \*

On Tuesday last our representative attended a special demonstration of the working of the "Hercules" concrete block-making machine at the premises of Messrs. Geo. Rome and Co., Clanwilliam Place, Dublin.

\* \* \* \* \*

Owing to the delay in the delivery of electro-type illustrative blocks, which Messrs. Hachette et Cie., of Paris, are making specially for us, we are obliged to hold over Mr. D. W. Morris's article on "Toulouse and the Midi," announced in a previous issue. We hope to publish the first part in our next issue.

\* \* \* \* \*

The public have heard little of late of the project to establish a gallery of modern art in Dublin; so it was with pleasure that we noted in the columns of one of our daily contemporaries an announcement that a meeting of the committee had recently been held, and that the question of temporary premises was discussed. We trust some good may come of this, as we had feared that the project was being allowed to drop.

\* \* \* \* \*

The dangers of quarrying were exemplified recently when an inquest was held at Bethesda on the body of Hugh Williams, a young quarryman employed at Pant-dreiniog. According to the evidence, Williams was working on the side of a steep rock, when a heavy stone from above descended on his head and threw him off the stage on which he was standing. A rope had been attached to his knees, a precaution usually adopted by quarrymen, and he hung head foremost for ten minutes before being rescued. Next day he died from laceration and depression of the brain.

\* \* \* \* \*

Williams's fellow-workmen stated that it was not customary to examine rocks from above, and the victim gained the stage from below. The coroner said that the quarrymen were very careless even with their own lives, but this case did not reveal any negligence on the part of anybody. A verdict of "accidental death" was returned.

\* \* \* \* \*

It is with deep regret that the elder members of the architectural profession will hear of the death, from heart failure, of Mr. Thomas Henry Longfield, F.S.A., M.R.I.A., at his residence, Harcourt Street, Dublin. Mr. Longfield was not so well known to the younger generation of architects in Dublin, as he for many years past took little or no part in professional affairs in Dublin. The duties of the important appointment he held in the Science and Art Museum, and his quiet and studious habits, caused him to come but little in contact with his architectural brethren in Dublin. He was an architect of wide and scholarly attainments, and a kindly personality. Years ago he was a prominent member of the Architectural Association, when it was first started, some thirty-six years ago; but he did not identify himself with the affairs of the revived association during recent years, nor with those of the Institute. Mr. Longfield was one of the oldest members of the Royal Institute of the Architects of Ireland, a member of the Royal Irish Academy, and a Fellow of the Society of Antiquarians.



## THE FIRE REQUIREMENTS OF THE LONDON COUNTY COUNCIL.\*

With Some Notes on Fire Resisting Construction.

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The London County Council have from time to time received powers to draw up and enforce requirements for the protection of buildings and their inmates from fire.

The following classes of buildings are chiefly concerned by these requirements:—

1. Public buildings, such as churches, concert and assembly rooms, etc.
2. Factories and Workshops.
3. Theatres and music halls.
4. Common lodging-houses.
5. Commercial premises having a floor more than 50 feet above the pavement.
6. Buildings in which sleeping accommodation is provided for more than twenty persons.
7. Buildings having projecting shop fronts.
8. Buildings storing petroleum or other highly inflammable goods.
9. Buildings more than 30 feet high, except dwelling-houses occupied by not more than two families.

The following gives a detailed list of the requirements governing each class of buildings:—

### 1. PUBLIC BUILDINGS.

The following provisions apply:—

**Staircases.**—1. The staircase must be brick enclosed. The staircases and corridors must be not less than three feet six inches wide for a building accommodating under 200 persons; for every additional 100 persons the staircase must be increased 6 inches, until a maximum width of 9 feet 6 inches be reached.

Every staircase over 6 feet wide must have a centre hand-rail. In lieu of a single staircase two may be substituted, each two-thirds the width, neither being less than 3 feet 6 inches wide.

Every gallery must have a separate staircase, with direct exit to the open air.

**Doors.**—Doors must open outwards, with no fastenings outside.

This last requirement should be amplified so as to exclude any fastenings whatever save those which open automatically by pressure from the inside.

### 2. FACTORIES AND WORKSHOPS.

An existing factory in which more than 40 people work must be provided with such means of escape as the Council consider reasonable under the circumstances of each case. All new factories must be provided with proper means of escape.

**Fire-resisting Staircases.**—Fire-resisting staircases should be of 2-inch teak or oak in flights of not more than 12 steps without winders. Treads to be not less than 10 inches, and risers not more than 7½ inches. Handrails should be provided on both sides, and carried round the landings.

The staircases should be on dead bearings, and enclosed with a partition of incombustible materials at least three inches thick, carried up through the thickness of the floors and ceiled with similar materials. All constructional ironwork should be encased. The staircases vary in width according to the number of people accommodated, but generally are 2 feet 6 inches for 100 persons, with 6 inches additional width for every further hundred.

**Incombustible Staircases.**—Incombustible staircases must be brick enclosed with a newel wall; the walls to be 9 inches thick, and carried up and sealed; no well-holes are allowed. The steps to be solid square or spandrel steps, supported at both ends on the brickwork. Handrails to be chased as far as possible flush with the walls.

Internal staircases are best placed against an external wall, and must be properly lighted and ventilated.

**External Iron Staircases.**—External iron staircases must be supported on dead bearings. The steps and landings to be of non-slippery material, and risers must be provided.

Handrails to be supported on close balustrades about 3 feet 6 inches high.

**Lifts.**—Lifts must be enclosed for a height of four feet above each floor level with 9-inch brick walls or with incombustible materials, and hardwood self-closing doors must be provided in the openings. Lifts must not be connected with any staircase.

**Doors.**—The doors must be of oak or teak, and must be solid without panels, and at least 1½ inches full thickness. Doors of deal are allowed in lieu of hardwood, provided they are sheathed with sheet iron and asbestos sheeting.

All doors must be hung in two folds to open in the direction of exit, and if fastenings are required only panic bolts or ball catches are allowed. Doors next staircases must be free of fastenings, and provided with metal springs to close them. They must be hung in lobbies so as to open clear of the steps and landings. The lobbies must be of similar materials to the enclosure, and must be ceiled, and the portion of the floor within the lobby must be pugged with 5 inches of concrete.

Doorways must not be less than 4 feet 6 inches wide.

**Floors.**—Those portions of the floors forming parts of an enclosure must be pugged.

The topmost floors of high factories must be of fire-resisting construction.

**Windows.**—Windows next the street should be casement windows, with cockspur fastenings only, and of a sufficient size to form an additional means of escape in case of Fire Brigade relief. These, however, are not considered to form an alternative, and are merely auxiliary means of escape. The glazing where forming part of an enclosure should be of either of the two forms sanctioned by the Council, viz., wire-wove glass or plate glass in electro glazing in 4-inch squares.

**Ladders.**—Iron ladders are allowed to facilitate roof escape. They are rarely used internally, but in some cases are allowed in conjunction with trap-doors, but they are not allowed in one flight between two floors. They must have flat treads and handrails both sides.

**Balconies.**—Balconies are allowed, and are useful to afford access between adjoining buildings when it is not desirable to cut doorways in the party wall.

**Bridges.**—Bridges are allowed for the same purposes, and they must not be enclosed.

**Roof Escapes.**—Roof escape is effected by means of trap-doors and step-ladders from the top floor, or by continuing the main staircase up to the roof. This latter plan is inadvisable, as it creates a strong up draught when in use, and the smoke and flame are thus drawn into the staircase.

All parapets must be provided with guard rails, and gangways must be formed with boards, etc., where necessary.

Climbing irons may be used in certain positions. Double doors should be provided in the main party walls to divide buildings of a large size.

**Gangways.**—Gangways 3 feet 6 inches wide must be maintained between the means of escape.

### 3. THEATRES.

**Site.**—An important special requirement in this connection is that one-half of the boundaries of the site shall abut on public thoroughfares.

**Dressing-rooms, etc.**—All staff and dressing rooms must be of fire-resisting construction, separated by brick walls with iron doors from the auditorium, and no hanging decorations are allowed.

**Gallery Exits.**—Two separate exits into different thoroughfares must be provided from each gallery.

**Vestibules.**—The vestibules must be one-third greater than the united widths of all corridors connected thereto.

**Proscenium.**—All doorways in the proscenium wall must be provided with self-closing iron doors. All decorations round the proscenium must be of fire-resisting materials.

The opening must be provided with a fire-resisting drop-curtain, with an arrangement for a water spray on the inside.

**Staircases, etc.**—Every public staircase and corridor must be of fire-resisting materials and not less than 4 feet 6 inches wide for 400 people, and for every further 100 must be increased as described under Public Buildings. They must have solid steps of incombustible materials with 11-inch treads and 6-inch risers; flights to have not more than twelve and not less than three steps in each without winders.

\* A paper read before the Institute of Sanitary Engineers.

The staircase shall be completely enclosed by 9-inch brick walls.

The staircases must be roofed with fire-resisting materials, and must have a continuous handrail on both sides chased into the walls where possible.

**Gangways.**—Gangways 3 feet wide must be maintained at all points, and must be kept free from temporary seats, etc.

**Ironwork and Limelight.**—All constructional ironwork must be properly protected.

All limelight tanks and boilers, etc., must be placed in a fire-proof chamber.

**Lighting.**—All thoroughfares which would be called into use in the event of a panic must be provided with a double system of lighting, such as gas and electricity, with oil or candle lamps, such lights being maintained whilst the public are on the premises.

No mineral oils or compo gas piping is permitted.

The stage, auditorium and staircases must be lighted by separate services and meters, both of gas and electricity.

Gas burners must have wire guards and chimneys, and the taps must not be available to the public.

**Doorways.**—All doorways used by the public must be at least 4 feet 6 inches wide; doors to be hung in two-folds to open outwards so as not to obstruct persons escaping. They must not open immediately upon a flight of steps.

Where fastenings are required they must be of such a nature that they will open automatically by pressure, no others are allowed.

Doors which are used in entrances may be hung to open both ways, but when opened inwards must be fastened back.

The above applies to all barriers and gates.

**Heating.**—No open fires allowed unless in staff rooms, and to be protected by screens.

Radiators must not be placed so as to project into gangways.

The H.P. hot water system is not allowed, but hot air and the low pressure hot water circulation system must be used, providing they have an open cold water supply cistern, and the pipes throughout are of galvanised wrought-iron with the exception of those in immediate contact with the boiler, which must be of copper.

The boiler must be of copper, wrought-iron, or mild steel, with a safety valve attached to boiler, and not to circuit pipes, so as to keep it free from soot.

**Water Supply.**—Hydrants must be provided, each having a 30-feet length of hose.

With the intermittent system of water supply, storage tanks containing 250 gallons for every 100 persons in the audience shall be provided.

**Fire Alarm.**—Theatres must be in telephonic communication with the nearest fire station.

**Notices.**—Exits must be indicated by large and legible notices, placed about 7 feet above the floor; all doors not leading to exits shall be accordingly marked.

**Miscellaneous.**—Wet blankets and fire pails must be kept in the flies and scene docks, with legible placards immediately above.

Hatchets, hooks and other appliances for tearing down the scenery, etc., must be placed in convenient places, and a responsible person must be employed to see that such appliances are ready for use.

Fire regulations must be conspicuously posted up and the whole staff should be made acquainted therewith.

In conclusion of this class there are stringent regulations affecting the proper insulation of the electric wiring for the prevention of short circuits and ignition from other causes.

#### 4. COMMON LODGING HOUSES.

The requirements for this class of building are substantially the same as for factories and workshops, and are enforced by virtue of Special Acts which provide that lodging houses must be provided with means of escape, to the satisfaction of the Council, before a licence is granted.

#### 5. COMMERCIAL PREMISES.

**Roof Escape.**—New commercial premises having a storey more than fifty feet above the pavement must be provided with an upward escape to the roof with access from thence to the roofs of the adjoining buildings, by means of ladders, bridges, balconies, etc.

**Guard Rails.**—Guard rails must be provided where necessary.

#### 6. HIGH BUILDINGS AND BUILDINGS ACCOMMODATING MORE THAN 20 PEOPLE.

All new and existing buildings having a floor higher than 50 feet above the pavement, and buildings in which more than 20 people sleep or work, must be provided with reasonable means of escape, and must not be occupied before being certified to this effect.

#### 7. PROJECTING SHOP FRONTS.

**Roofs.**—Any building having a shop front on the ground floor projecting 7 feet or more beyond the main front, must have the roof constructed of fire-resisting material at least 5 inches thick. Concrete pugging is allowed.

**Roof Lights.**—Any roof lights must be constructed of fire-resisting materials for a height of 2 feet above the roof.

#### 8. BUILDINGS STORING INFLAMMABLE GOODS.

Buildings used for the storage of petrol, petroleum, turps, methylated spirits or any other inflammable liquids must not have any parts used as a living room or workroom unless adequate safeguards are taken against the spread of fire, and unless ready means of escape are provided from the living rooms.

#### 9. BUILDINGS MORE THAN 30 FEET HIGH.

New buildings of this class must be provided with roof escape. Buildings containing not more than two families are exempted from this portion of the Act.

The foregoing list gives but the merest outline of the actual requirements, and is intended only to show their scope. There is a number of saving clauses, and certain of the above-mentioned buildings are exempted.

**Method of Procedure.**—In the case of existing buildings the general method of procedure when serving requirements is as follows:—Plans are prepared by the Council by the aid of which a list of requirements is formulated. It is usual for the official making the requirements to inspect the premises, but they are mainly drafted on the plans. This, I think, is the chief reason that a great many of the requirements are not practical.

The list as forwarded leaves all details and methods of construction to the building owner, so that it may be argued that the Council have no need to be strictly practical in their requirements.

It is usual for the building owner to submit proposals showing an alternative arrangement.

An important point to notice is that the Act states that the Council are empowered to make only such requirements as are reasonable, which implies that each case is to be taken on its merits.

My experience of the London County Council is that they do not consider each case on a distinct basis, but attempt to apply stereotyped requirements without sufficient regard to the effect it will have on the business carried on in the building. Thus the provision of a new staircase is repeatedly insisted upon regardless of the fact that it may open up communication between workpeople of different sexes; again, in the case of patent and secret manufactures, facilities are afforded to undesirable persons to gain access.

External iron staircases are a continual source of thefts and other annoyances. Exit doors next the street must be set back in lobbies in order that the doors may clear the pavement. These recesses are put to improper uses in poor neighbourhoods such as factories and common lodging-houses generally occupy. The facilities for roof escape and the increased number of exits in the latter class of buildings necessitate the employment of a large staff for supervision, and cause serious trouble to the police, as they form a ready means of escape for the large number of criminals who use these premises.

The cost incurred in complying with the Council's requirements for a common lodging-house for 200 or more lodgers will generally run into three figures, and for these and also for factories the amount is often set out of all proportion to the value of the premises.

There are many appeals therefore against what the building owners consider unreasonable requirement, but the



Council's requirements have generally been upheld by the legal decisions.

**Guiding Principles.**—The main principles employed by the Council in formulating requirements appear to be as follows:—

1. Separate and distinct means of escape from every room, with direct access to the open air, should be provided. This can be effected in several ways, such as by two staircases, or by a staircase and access to the roof, or access to adjoining buildings by means of doorways, balconies, bridges, &c. The alternative means of escape should be as far apart as possible.
2. The buildings should be divided up, both vertically and horizontally, into as many fire risks as possible by means of walls, partitions and floors, with self-closing doors, &c.
3. Well-holes acting as flues must be enclosed.
4. All means of escape must be protected with materials sufficiently fire-resisting to withstand fire for 30 minutes.
5. Means of escape must be of ample dimensions, and otherwise constructed to avoid accidents in time of panic, even though from a false alarm.
6. Endeavour should be made to keep back smoke as well as flame.
7. The most direct routes should be taken to the open air.
8. All "dead ends" should be avoided.

The following schedule of fire-resisting materials is set forth in the London Building Act:—

- Good stock bricks.
- Granite or stone.
- Iron, steel or copper.
- Slates and tiles.
- Terra-cotta.
- Flag-stones under certain conditions.
- Concrete formed of cement or lime and broken bricks, tiles, stone, ballast, pumice-stone, coke-breeze.
- Reinforced concrete.
- For doors and similar fittings, oak, teak, jarrah, or other hard woods, 1½ inch full, in solid bedded frames. The same for stairs, internal and external, with plaster soffits.
- Beams and posts of hard woods with 1 inch of plaster, on metal lathing, or when in combination with iron, 2 inches of plaster.
- For floors, concrete and iron 5 inches thick.
- For ceilings of projecting shops, 5 inches of concrete pugging.
- Enclosures and partitions of 3-inch incombustible material.
- Glazing in wire-weave glass ¼ inch in thickness, or electro-glazed glass in squares of 20 inches.

It should be noticed that the provision of stone steps and iron doors is often required by the Council. Both of these are quickly destroyed by the action of fire and water, and should, I think, be eliminated from the Act.

#### NOTES ON FIRE-RESISTING CONSTRUCTION.

The common expression "fire-proof" is hardly a correct term, as no building materials are proof against fire, and are still less so when built into a structure by reason of the joints and the different expansions of various materials under heat, when used in combination.

A material which will stand a great heat may immediately be destroyed when drenched suddenly with water, such as will certainly happen in any ordinary conflagration. A material cannot therefore be considered of value as a fire resistant until it has—to use an old expression—passed through fire and water.

The following précis of the effects of the great Cripple-gate Fire in London in 1897 is instructive:—

- Ordinary stock bricks almost uninjured.
- Perforated bricks broken to pieces.
- Stone destroyed.
- Iron girders twisted and curled up.
- Wooden beams charred, but otherwise practically uninjured.
- Match-boarded burnt to tinder.

Allowance for expansion must be considered. Concrete and iron expand in the same ratio, but terra-cotta and iron do not.

It is well to remember that although the first cost of fire-resisting construction is large, the insurance rates and rent roll are both favourably affected thereby. Architects should not take upon themselves the responsibility of specifying a material which has not been tested.

Elaborate tests have been carried out by the British Fire Prevention Committee with all the ordinary forms of construction and most of the well-known patents. They divide the tests into three classes: (1) Temporary protection, which implies resistance to fire for three-quarters of an hour; (2) Partial protection for one and a half hours; (3) Full protection two and a half hours.

#### MATERIALS WITH REGARD TO THEIR FIRE-RESISTING QUALITIES.

Well-burnt clay bricks are the most reliable building material. Lime mortar is to be preferred to cement. Fire-clay is of course best, but is not so strong.

Terra-cotta in its porous form is highly satisfactory. There are several other descriptions of terra-cotta which are all more or less useless as a fire-resisting material.

Plaster made with plaster of Paris is a tolerable heat resistant, as it stands drenching at a white heat; it is improved by the addition of asbestos or pumice stone.

Concrete in slabs of which the aggregate is pumice stone is cased with the "full resistance" materials.

Reinforced concrete is an excellent fire resister, providing the reinforcement is two inches from the surface.

The following compositions of concrete are given as being highly serviceable. The effects of severe tests with fire and water are also briefly given. The following proportions are mixed with one part of ferro-cement, the sand being sharp pit sand:—

1. Slag 3, sand 2.—Slight cracks and deflection.
2. Broken granite 3, sand 2.— Ditto.
3. Broken granite 3, sand 2.— Ditto, and washed off slightly.
4. Burnt ballast 5.—Washed off badly.
5. Coke-breeze 5.—Washed off slightly.
6. Furnace clinkers 3, sand 2.—Slight cracks and deflection.
7. River ballast 3, sand 2.—This is wholly bad.

Sandstones are better than limestones and granites, but all are unreliable.

Iron and steel unprotected are unfit for use for constructional purposes. Iron expands about 1½ inches in 10 feet under prolonged heat.

Silicate cotton, slag wool or asbestos are useful materials, as they are quite incombustible, and may be procured in slabs and sheets, or in the form of cloth.

Timber in baulk is perhaps as good a fire resister as can be obtained, as after it is once charred it burns very slowly, and retains its strength when suddenly drenched. Its life is greatly increased by being coated with plaster or tin. The so-called fireproof paints are of very little practical value.

The possibility of ignition of timber may be decreased by the use of tungstate of soda, silicate of soda and lime-wash, and asbestos paint. These, however, merely resist ignition, and cannot be considered to resist fire. Treated woods become hygroscopic and brittle, they also discolour and are hard to work.

Floors are of many descriptions.

Arched floors are strong, but heavy and expensive.

Various forms of hollow tubes and slabs of terra-cotta and asbestos, &c. These are all cheap, light and serviceable.

Concrete reinforced with steel rods makes an excellent floor.

Pavings may be of cement, asphalt, metallic paving, wood blocks and wood boards laid directly on to the concrete; these should be tarred on the underside.

Cork carpet on concrete makes a very good floor.

A tongued wood floor of ordinary construction with plastered ceiling will stand an ordinary conflagration for about an hour.

Flats are constructed similarly to floors, but are lighter and are best asphalted, vulcanite and wood cement are also largely used.

**PARTITIONS.**

Ordinary lath and plaster partitions when the intervening spaces are filled in with slag wool, are rendered fire-resisting and sound proof.

Other light partitions are formed in concrete, brick on edge, terra-cotta, asbestos and other slabs, uralite, expanded metal and plaster, or fine coke-breeze concrete, all of which may be fixed on a steel or wood frame work.

An air space in the thickness of a partition is a great advantage.

Continuous sheets of metal, when used for reinforcement are bad, as they tend to buckle under heat.

**STAIRCASES.**

Balk timber is the best material for steps. Other steps are constructed of reinforced or ordinary concrete, stone and built-up hardwood.

**DOORS.**

Iron doors, as stated before, are required by the Council, but unless secured all round the edges are practically useless. Sliding doors are best, as they can be held on at least three sides.

Armoured sliding doors are perhaps the best for use in party walls between large buildings. These are made up with wood and uralite, or sheet tin, and can be arranged by means of inclined runners so that when a certain temperature is reached the door fastenings give way and the door is allowed to close automatically by gravitation. I have used this description of door as made by Messrs. Mather and Platt, and always find them to be serviceable for general use.

**GLAZING.**

This has already been described under Factory Buildings. Opinions differ as to whether roof glazing over staircases, well holes, &c., should be fire-resisting, or whether it should be constructed so as to break in case of fire and carry away smoke and flames. I think this is a bad principle, as every time a staircase door is opened huge volumes of smoke are drawn in and thus render the staircase impassable. The use of shutters is not advisable.

**MISCELLANEOUS.**

Simple precautions against the spread of fire should be employed in every class of building, such as floor pugging and treating woodwork with solutions and the use of steel roofs and concrete stairs with wood casing.

**Sprinklers.**—Automatic sprinklers which act at a temperature of 150 to 200 degrees are useful for checking a fire in its infancy, but are open to objection.

Automatic fire alarms are useful, but require constant attention.

**CITY OF DUBLIN TECHNICAL SCHOOLS.**

We have before us a copy of the prospectus, calendar, and time-tables of the above institute for the session 1906-1907. To merely enumerate the various subjects on the curriculum of the schools would occupy more space than we have at our disposal. Suffice it to say that practical and theoretical instruction are given in science, art, technology, commerce, and domestic economy. There are now two branches of the schools—the parent house, as it may be called at Kevin Street, and the new offshoot at 12 Rutland Square. At the former are science, art, technological, and domestic classes; at the latter commercial and domestic classes. For students of and apprentices to the engineering, building, and kindred trades, a fine course is provided under teachers whose names are a guarantee of the quality of knowledge and training imparted. Progressive courses of study are mapped out for the guidance of pupils, who are strongly recommended to take them up in regular order. We would earnestly impress on employers in the building and engineering trades the desirability of encouraging their younger employees to attend these classes. The fees are so low that the classes are practically a gift.

A fine course of commercial instruction is given at Rutland Square, where we notice a new class in business methods has been established. We have read the syllabus of this class, and regard it as one of the most important in the schools. Junior office hands in any business, as well as boys and girls who intend going into commercial life, would be well advised to attend it. The senior course in this subject fully covers the field of higher commercial training.

**CORRESPONDENCE.****ARCHITECTURAL MORALS.**

TO THE EDITOR OF THE IRISH BUILDER.

SIR,—I have read in your valuable journal the address of the President of the Architectural Association of Ireland, and, in my opinion, no more appropriate remarks have yet been made publicly regarding the profession in this country, and I am exceedingly sorry that I was unable to be present to hear such a timely and pertinent "Talk" as Mr. Holloway modestly designates his address. If we had such a "Talk" and now and again from the President of the Irish Institute, and from the "Head" of that august body, the Ulster Society of Architects, perhaps architectural morality and professional etiquette would in time reach a much higher standard of purity and excellence than either do at present. I quite understand that there are a large number in the profession who are not members of the Institute, but it does not follow that they are all antagonistic to it. On the contrary, many of them are in full sympathy with it, and act up to the principles it inculcates (the writer is one of those). As for that body which I prefer to call the "Four Per Centers in Ulster," there are architects in this province who would have nothing to do with them under any circumstances. Although such a "Talk" might not have any effect on the low tone of professional morality and etiquette prevailing amongst a section of those outside both the bodies I have mentioned, it might do some good within the fold. I am a very obscure member of the profession, but I hold that an architect should, first of all, be a gentleman in his conduct towards, not only the clients and contractors with whom he has to deal, but also his brother-practitioners. When I started on my own account, now many years ago, I resolved that I would neither, directly or indirectly, tout for patronage, would not work for reduced fees, nor step unfairly into another man's shoes. I have kept that resolve in both the letter and spirit, but what a bitter experience I have had of the professional, or rather unprofessional, conduct of some of those who consider themselves gentlemen, and who ape at and would like to be considered eminent. One of them stepped into my shoes in one case under the most unfair circumstances, and in another case tried his best to oust me from a position I still hold—and he had the privilege of putting five letters after his name. Another took my place even before my client informed me that she would not build "at all," because I could not get the building erected, as she required, for £500, notwithstanding that she had promised to spend £750, and that I had procured tenders, the lowest of which was £712. However, my eminent professional friend from the "Northern Athens" stepped in, got tenders, some of which were as high as £1,400, then he whittled down until he got one at £770, which was accepted, and the house built without a plan of it being submitted to the Urban Council. And why this omission? Simply because I had submitted my plans to the Council, who had approved of them, and my friend, knowing this, took advantage of it. I wrote him concerning his professional conduct towards me, and had a note saying he would reply to my letter, but he has never done so, because, like all other gentlemen of the same stamp, he considers discretion to be the better part of valour. This great light can put no less than nine letters after his name, but I expect he will be dropping five of them now, so as to be in unison with his illustrious brethren in one particular matter.

Then, as to undercutting in fees, why, I am quite accustomed to be told as follows:—"Mr. So-and-So will do the work for 2½ or 3 per cent., and then you know I will get the work done cheaper by the contractor, because you are considered to be too particular by contractors, and they will not tender so low on your specification as they will on Mr. S-and-So's, as they say he is much easier to please." Well, all I can do in such a case is to let Mr. So-and-So get the commission. I could enumerate many other cases of unfair tactics which I have personally met with, but will just give one more. A few months ago I was instructed to get business premises rebuilt, and my client said he wished the work done for a certain sum. I told him it was impossible, but that I would do my best for him. I



did so, but he would not accept the lowest tender. I then requested him to make any alterations or cut down the work as he wished, but he would not do so, as he was satisfied my work was all right. He then agreed to wait until I would get more tenders. I wrote to other builders, some of whom were ready to tender, but in three days I had a letter from my client telling me not to do anything more, as he had made other arrangements, which arrangements, I learnt afterwards, he had actually made at the time of his interview with me, and the next thing I saw was the work being immediately started under the supervision of a C.E. who has commenced practice here. The builder who has got the work was the very man whom my client advised me not to ask to tender, as he had no practical knowledge of building, and now the work is going on famously, a three-storey house—front and back walls nine inches thick, inside walls all stud lath and plaster, outside of front walls cement plastered, just what my client instructed me not to have.

Mr. Holloway speaks about the want of respect that the public have for the profession—is it any wonder when the members of it stoop to such mean and contemptible tactics? Then as to the value placed upon an architect's evidence in a court of law, and the sneering manner in which the evidence of members of the profession is often alluded to by both judge and counsel, Mr. Holloway is quite right; but why is this so? Just because there is a want of that cohesion and desire to uphold the honour and dignity of the profession which should animate every member of it. As a rule, this sneering of judge and counsel is in reference to the differences of opinion in the expert evidence, but in what profession is there a greater difference of opinion than in that of the law? Lawyers should be the last to sneer at this difference of opinion, because if there were no such differences of opinion and no disputes there would be no work for lawyers. In fact, such differences of opinion are the very life-blood of the lawyer's existence, and he should be the last to sneer at them. But there would be no such sneering if the members of our profession were as zealous for its honour and dignity as they should be.

As to the "daubs" which the President speaks of, I thoroughly agree with him, and what about the drawings and specifications which some of the eminent ones issue? A number of these gentlemen are not in favour of "Registration," because at the first they would be obliged to recognise their more humble brethren. But what a sorry figure some of these high and mighty ones would cut had they to pass an examination in practical building construction and specification writing, or even in making out a working drawing—they would not then be able to rely on the contractor's foreman to work out their pretty picture as best he might.

Not long ago there was a job of drainage work to be done here, and of such a nature that required accurate levels to be taken; but, of course, there was no local man considered competent to carry out this £250 job, and so a great Mr. Infalible had to be sent for. He arrived. Then a few weeks after in came a contractor's manager to see if I would explain to him what the "eminent" meant in regard to some portions of the work. I at first refused, but as he was obliged to send in his tender the next day, I at last consented to assist him; but judge of my surprise when I saw the precious documents—not a level given of any part of the work, a mere outline plan of the building traced off the ordnance sheet, and a red line showing the direction of the drains, no levels shown, and the whole production such as a boy twelve months in an office could easily prepare. But at the top (Oh, ye Gods!) it was numbered so many thousands, and with an imperative demand "that it should be returned." As to the specification, "the contractor was to take all particulars" (these must have included the levels, as none were indicated). "The cement used was to be from a maker to be approved of in writing, the contractor was to be responsible for everything necessary to be done to leave the job complete," and a considerable amount of work, other than sanitary, was certainly necessary, but same was not particularised. "The pipes were to be from an approved maker, and the

contractor was to name said maker in his tender." There were four or five tenders sent in. Result—the lowest tender was less than half the amount of the highest, and about £100 under the next lowest. It was accepted, the work done and covered in, and "then" the eminent came and passed it. Now, I have heard of this gentleman speaking in the most condescending manner about how "we" should sympathise with our less "educated and plodding brethren in country towns" "who are trying to make a living."

In conclusion I say, "Bravo," Mr. Holloway. We badly require a few more men to "Talk" likewise.

I hope you will pardon this long letter, Mr. Editor, but I feel so strongly on the matters I have mentioned, that my feelings have got the better of my discretion, and the only excuse I have in asking you to insert it is, that I am not troublesome in this respect.

Yours, etc.,

AN ULSTER ARCHITECT.

Name and address enclosed, but not for publication.

## ANSWERS TO CORRESPONDENTS.

### Keeping Tiled Pavements Clean.

P.L. writes to know how to keep tiled pavements and wood block floors clean.

Wash with cold water and soft soap, applied with a scrubbing brush. This will improve the colours, and remove the saline scum arising from the cement the first few weeks after the tiles are laid. During that time the tiles should be frequently washed. Stains or dirt, from neglect of cleaning, may be removed by Muratic acid, diluted with half water, and applied with a pumice stone. The acid must be carefully wiped off, and always, after washing, the tiles should be well wiped with a clean dry cloth. The water used should be perfectly clean. Very diluted sour milk much improves the colour of the tiles. Soap or acid should be sparingly used and applied with the greatest possible care, all being completely washed off. The above applies to unglazed tiles only.

Glazed Tiles:—For glazed tiles a dry, clean duster is usually sufficient. When needful sponge with clean water, and polish with a perfectly dry cloth. Acid should not be applied to glazed tiles.

Generally speaking sour milk and water, applied with a sponge, and then polished off with a soft cloth, should be used.

Mr. J. F. Ebner, of London, supplies the following instructions for cleaning wood block floors:—

Begin by sweeping the floors, then rub hard with a stiff brush (the best being one specially prepared for the purpose), and finish by sweeping off all dirt detached by the brushing. This will suffice in ordinary cases, but if the floors are very dirty from blacks, etc., wash them by rubbing with a clean rag dipped in turpentine.

If "Sunshine" Polish is required as a cleanser, add turpentine gradually in equal volume to the concentrated solution; it will be found to readily assimilate if quickly stirred.

To apply the "Sunshine," use clean cotton waste or white rags, which should be renewed from time to time. The rags may be re-used after washing with strong soda.

As a floor polish, apply a small quantity of "Sunshine" evenly with a flannel. When dry, brush with a hard-hand or weighted brush.

For final polishing it will be found useful to place a piece of flannel or similar soft material over the fibres of the brush.

In most cases one or two applications of "Sunshine" Polish will suffice. Where floors are very rough, it will be found an economical method to have them re-planed or scraped, or the surface prepared in a similar manner to that adopted by polishers with open-grained wood—viz., by rubbing it well with a mixture of linseed oil and whiting. The surface should then be wiped and allowed to become dry before applying the "Sunshine" Polish.



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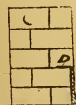
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## THE CATHEDRALS AND CHURCHES OF THE RHINE AND NORTH GERMANY.\*

It is now some three years or so since we reviewed the first edition of Mr. T. Francis Bumpus' charming book on the Churches and Cathedrals of the Rhine and North Germany. Since then the work has gone out of print, and more recently the author has practically re-written the whole. The illustrations, in particular, are added to, and tend greatly to add to the educational value of a volume dealing with a subject upon which the literature relating thereto is somewhat scant. He has found it possible to eliminate some matter that was not essential, and has added some notes dealing more directly with the subject in hand. In particular, Mr. Bumpus has added some interesting particulars of the fine brasses existing in many of these little-visited German towns.

It is a pleasure to read a book written as Mr. Bumpus' is, with an enthusiastic regard for the old architecture of North Germany.

The church work one sees in Northern, and indeed in all Germany, is, no doubt, poor, indeed, in comparison with the great Cathedral churches of France, Amiens, Rouen, Chartres, and St. Denis, and so on; neither has Germany anything that can even remotely compare with the glories of that superlatively fine church reared by the monks of Ely amidst the Fens, or with dozens or more other great churches of which England has every reason to be proud, and which constitute her history written in stone.

These North German cities were simple burgher towns, devoted wholly to humble trade, wholly different

in all respects from the great wealthy towns of either France or England. Even in the material used they suffer in comparison with France; and England seldom had recourse to poor material, England only in a few cases in the East, and France in a few comparatively isolated places, resorted to brick. England in its entirety, and France almost so in the noble churches of the Isle de France, never were troubled on that score, and with this in our minds we must judge the achievements of the various countries when we compare them. From every aspect, France and England in the twelfth and thirteenth centuries had advantages such as no other countries in the wide world ever could claim. With such digression, one may consider the architecture of Northern Germany, where brick in a comparatively poor and humble character was so largely employed.

North Germany is not known, as it ought to be known, to the architect and student of architecture; for throughout the quiet towns of its provinces there are many beautiful churches, not, perhaps, of a type such as we have before referred to, but nevertheless full of interest, and, as Mr. Bumpus tells us, in no country of Northern Europe have the churches retained more of their mediæval character and of their furniture and equipment. In fact, he goes so far as to say that "to North Germany the student of mediæval furniture and equipment must go." Here provincial localisms are more strongly marked than, perhaps, any other country, and here, too, may be seen that curious struggle between the round arch and the newer pointed style. In England, and in France proper, the pointed arch soon swept out of existence the use of the round arch, though in the South of France, as around Bordeaux, like as in North Germany, the round arch lingered long. The people seemed loth to part with it.

The schools of architecture of Germany may be divided into the churches of Westphalia, Saxony, the Rhenish provinces, and that great tract of sandy, level country stretching from the Baltic. Mr. Bumpus refers to some other districts, such as Suabia and Sileria, which contain much work of a distinct and peculiar interest. He goes on to sketch an outline route for the traveller, whom he warns against beginning with Cologne, after the usual fashion, for by so doing he leaves much of the greatest interest behind; which is perfectly true, great as the interest of Cologne with its round architecture is. The ordinary traveller prates of the perfection of the Cathedral, or "Dom," of Cologne, wholly neglecting the many minor and beautiful churches of that historic and ancient city, such as the Mauritius Kirche, the Apostles' Kirche, S. Gereon, S. Martin, S. Cunibert, S. Severus, S. George, and Santa Maria im capitol. The vivid impression which these fine churches made on us, now many years ago, we still retain. It is, in fact, safe to say that there are few Romanesque churches in existence of greater interest than St. Gereon at Cologne, once, as Mr. Bumpus describes it, the nucleus of a great collegiate church. The main fact remarkable about these Cologne churches is, that in parts they date from the second half of the thirteenth century, while still retaining all their Romanesque feature.

Mr. Bumpus outlines a very pleasant tour, which includes Limburg, Zanten, with its collegiate Church of S. Victor (which we illustrate), Romanesque as to portion of its western towers, complete Gothic in its transeptless nave and choir, and one of the best examples of a North German church, in which the mediæval arrangements have been maintained. Many other interesting old towns are visited—Cologne, Liege, Aix-la-Chapelle, Werden, Mayence, Speyer, and Worms.

These are but a very few names taken at random from the widespread ground covered most completely by Mr. Bumpus, and, of course, would be far too extensive a tour, save for one with unlimited time at his disposal, but a brilliant architectural holiday might be

\* "The Cathedrals and Churches of the Rhine and North Germany," By T. Francis Bumpus. Eighty-four illustrations and a map. London: T. Werner Laurie, Clifford's Inn, M.D.C.C.C.VI.

arranged from the rich material dealt with by Mr. Bumpus.

A very fine church, typical German, and one which serves well as a type of a church dealt with in this

## COMMENTS.

### Selby Abbey.

The news that Selby Abbey had been destroyed by fire must have caused the greatest regret to every architect, every antiquary, and every lover of the beautiful, not alone in England, but throughout the kingdom. Fortunately, the rumour of its total destruction has proved to be greatly exaggerated.

No more beautiful abbey existed in England, not of the largest size, but of great beauty and exceptionally well-preserved, and at the time of the fire it was in actual use as a parish church. We understand that steps have been taken already to promote the restoration of the injured fabric, and questions relating to a Government grant have been put in Parliament, with a view to securing Government aid.

One of the chief glories of Selby was the magnificent Norman nave (the original foundation being in 1069). Part only of the nave is Norman, the remainder of the decorated period.

The nave has been much injured, but remains substantially. The choir and east end, of very beautiful decorated work, also remain, though much injured, the east window being one of the chief features of Selby.

The original 15th century timber ceiling has been totally destroyed. Indeed, the place may be said to have been completely gutted, amongst the minor losses being a new organ, which had just been completed at a cost of £1,600. It is hoped that the fabric may only stand in need of some repair, and roofing in, and that, as a whole, it may stand unspoiled by "restoration" in the customary sense.

The architect to the abbey is Mr. J. Oldrid Scott.

record, is the Cathedral of S. George at Limburg-on-the-Lahn, in the Duchy of Nassau, which we also illustrate. It was begun in 1213, and finished in 1242, and is unrivalled as a monument of that mingling of round-arched and pointed gothic to which Rhenish Prussia held with such tenacity, long after the disappearance of the former from other lands. The view which we publish (through the kindness of Mr. T. Werner Laurie) is a view from the N.W.

The plan is simple—a nave of three great vaulting compartments, the most western covered by the towers; transepts, and an apsidal choir, round which there is a processional aisle, with chapels; these are curiously worked in the thickness of the walls. Externally, the whole forms a group of seven spires, which Mr. Bumpus declares are probably unrivalled for grace and majesty. The triforium in this church is used as a "männerchor," or men's choir, and is said to be both satisfactory in appearance, and useful.

A very nice and characteristic example of grouping may be seen in the abbey church of Laach, in Rhenish Prussia, of which we publish a view.

Mr. Bumpus admits that these churches cannot compare with the Broach spires of Leicestershire, Lincolnshire, Northamptonshire, or in the district surrounding Caen; nevertheless, such a group at Laach has a beauty and dignity all its own, and one that accords admirably with its surroundings, which, after all, is the great test. Laach is described by Mr. Bumpus as being as typical an example of the national thirteenth century style as any in Germany.

It is impossible for us to give our readers any further glimpses of North Germany from Mr. Bumpus' delightful and sympathetic book, to which we must refer them. That he is full of sympathy, not merely with the bare fabric of the churches themselves, but with the surroundings, the music, and atmosphere of the quaint old churches and towns, is evident from the whole tone of his chapters. That entitled "A Sunday in an old German Cathedral City" (Paderborn, in Westphalia) is a quite beautiful essay, evincing that the author must have drunk in deeply the charm of the old place; and one can almost fancy one hears the old psalm sung by the choir of men and boys, or the soft, low tones of the organ echoing through the vaulted aisles of the old church.



Zanten. Choir of the Collegiate Church.



Limburg-on-the-Lahn. (The Cathedral from the North-West.)



## HISTORIC ORNAMENT.\*

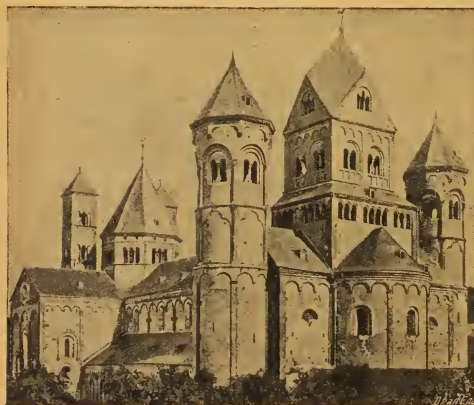
We have just received from Mr. Batsford a little work by Richard Glazier, which undertakes the somewhat ambitious task of treating of the evolution, tradition, and development of architecture and the applied arts.

Mr. Glazier, in addition to being an associate of the Institute of Architects, is the Head Master of the Municipal School of Art at Manchester, a school which, during recent years, has displayed much vitality; in addition, he shows great discernment of the needs of students, a quality not always prominent in those themselves possessed of knowledge.

The edition, presently under consideration, is the second published, and, no less than the first, bids fair to become popular amongst students and amongst those desirous of obtaining an insight into the seemingly mysterious boundaries which border and define the various phases and periods of architecture and of art generally. To those who have had to do with the average architectural pupil, it is abundantly clear that a considerable difficulty exists in segregating and defining the various periods—absurd as such a difficulty may appear to any who have made the study of architecture, even in an elementary sense. Yet, the fact remains that the beginner invariably divides his architecture into pointed and round, and to him there are little or no differences, save such as are expressed by the term "pointed" and "round"; "pointed" is "gothic," and "round" is round. Such subtleties as "Romanesque," and still more so the sub-divisions of that period, the wide gap there is between the Roman work and the revived architecture of the later Renaissance, have little or no meaning.

To beginners, therefore, "Glazier's Ornament" will be most useful in guiding their first steps; and the author, having much to do with beginners, knows how to put the matter before them. The work is pleasantly written, and is profusely illustrated by very well drawn illustrations, which, in themselves, are admirable as models. In addition to architecture proper, ornament and applied art generally is dealt with. The book is but a small one, and, of course, is not intended as a standard work of reference, but, for the use of the young student and the cultured amateur, we know of nothing better for acquiring a good elementary idea of the various styles and periods of art. Indeed, it may be studied with pleasure and profit by others more advanced, for there is condensed in it a vast amount of information and clear and delicate reproductions of drawings and sketches.

\* "Historic Ornament, a Manual Treating upon the Evolution, Tradition, and Development of Architecture and the Applied Arts. Prepared for the use of Students and Craftsmen." By Richard Glazier, Hon. Associate of the Royal College of Art, Associate of the Royal Institute of British Architects, Head Master of the Municipal School of Art, Manchester. Price 6/- net. London: B. T. Batsford, 94 High Holborn.



The Abbey Church of Laach. (A typical group of Rhineland steeples.)

ARCHITECTURAL ASSOCIATION OF IRELAND  
JOTTINGS.

The session is now fairly under way, launched by a spirited address from our new President, which should be remembered with advantage by all his hearers. He struck the proper note as to the necessity for high architectural morals if the profession is to retain even its present not too exalted position, and as the students of to-day will be the practising architects of to-morrow, it is to be hoped his impressive words will bear good fruit. The necessity for using Irish materials wherever possible will also commend itself to the Association. The committee has already followed this sound advice by purchasing a locally-made carpet for the library. Its colour is red. May it wear well.

\* \* \* \* \*

Whether the introduction of the contentious words "Home Rule" into a presidential address is a fashion to be followed in later years is, perhaps, open to question. For ten years our society has religiously eschewed politics in any shape or form, although its members in their own humble way, both individually and collectively, have endeavoured to forward national interests in both art and commerce. For these reasons possibly the Association has steadily progressed from its initiation both in numbers and influence. Home Rule may mean the millennium to some, although the fine old buildings to which the President referred as erected during the sitting of the Irish Parliament in College Green are hardly happy examples of a national style, being purely of the type of the Classic Revival. Nor are they monuments of the use of Irish materials, practically all the dressed stone being quarried in England, to mention only one of the imported materials with which they are constructed. To many of the President's hearers, "Home Rule" possibly means repression of free thought, free speech, and loyal sentiment, a state of affairs in which every aspect of artistic, commercial, public, and social life will be strongly tinged with insularity, and under which a man's ability, in any walk of life, will be measured by his ability to write and speak Gaelic. Such opinions may be right or wrong. They are doubtless exaggerated; but it is the essence of wisdom only to combat them with occasion. Therefore, let us hope that, as heretofore, politics will be hung up with our hats and coats in the cloakroom.

\* \* \* \* \*

By dint of importunity, Mr. Beckett's scheme for a loan library bids fair to be put into practice. It is suggested that members should lend books for mutual benefit and instruction. These volumes will be catalogued and placed in the library for reference only. If the proposal meets with its due support, a valuable addition to our present bookshelves will be obtained. Further volumes are also to be purchased for lending purposes, and when the room is furnished its appearance will be considerably more inviting than at present. Contributions for the latter purpose are flowing in, chiefly from the committee, as usual.

\* \* \* \* \*

The annual smoking concert will be held at the Four Courts Hotel on November 13th. The committee having charge of the arrangements is the same as last year. An excellent programme is, therefore, a certainty. If every member makes a point of being present and inviting a guest, the comfortable room which appealed so much to all at the last concert will be properly filled, and the A.A. coffers will receive due replenishment.

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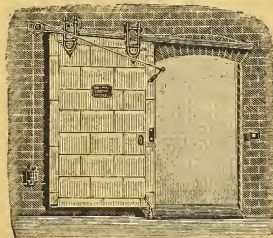
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## ARCHITECTURAL MATTERS IN LONDON.

At the opening meeting, the President of the London Architectural Association, Mr. R. S. Balfour, gave his inaugural address, and touched upon a variety of topics. The Association was in a flourishing condition, he said, though somewhat weighted with a building debt; nevertheless, the fact that the membership had increased by over 50 since last session showed that progress was being made, there being now over 1,700 members. We do not quite share the President's elation, as it is hard to see how and where all these budding Bramantes and Inigo Jones are to find work and wage of a reasonably remunerative character, still less where they may hope to find professional practice as masters.

## The Day School.

As our readers are aware, the London Association some years ago established a day school, to supplement the training given in the old evening school, through which so many successful architects have passed. Of the day school Mr. Balfour remarks:—"The A.A. day school, that young but vastly vigorous seedling in which the Association feels the proud proprietorship of parentage, is already bearing good fruit, and it has, moreover, assumed a prominent position in our daily life here. What food for consideration the following figures suggest:—In session 1903-4 there were thirty-two students; in session 1904-5 there were forty-two students; in session 1905-6 there were 63 students, and we have started the coming session with sixty-five students, with the immediate prospect of several more joining, so that we anticipate having an increase of at least ten this term. Now, I want you to understand that these figures by no means represent the grand total of students whom we might have on our books if we accepted all the applications we receive. In the first place, our accommodation is limited, and we are by no means desirous of crowding our students. We are not a money-making concern, and therefore our sole wish is to give the best instruction we can under conditions as favourable as the exigencies of the case permit."

## The Evening School.

Of the old night school he says:—"Our evening school under its new conditions will, we fully believe, establish itself firmly upon an even more permanent basis than hitherto, now that it has been brought into a line more fully approximating with the requirements of our general scheme. In the past it has been a complete success, and it is difficult to see how it can in any way be impaired by the re-arrangement of its curriculum. The Council had every confidence that Mr. T. Frank Green would achieve this goal, and the fifty who have already joined distinctly indicates that they have not been mistaken. One is glad to think that so many of our students attend our evening school and lectures, and they are more worthy of commendation than those who attend the day school, for it is no light effort to summon up courage, after a hard day's office work, to attend the instruction given here, at hours when others are seeking relaxation and amusement. Such enthusiasm brings in the end its own reward, and even at the time it tends to gratify that primitive instinct of satisfaction within one of, as it were, stealing a march upon others.

"Anyone who has taken the trouble to examine in detail the recently-published curriculum of our school of architecture must have noticed a very extensive revision in the courses of instruction. The experience we have gained by past years, those wider and ever-increasing needs of the profession, and the demands made upon us by those who come to us to be taught, have caused your executive, after careful inquiry and a very full and complete investigation into the numerous suggestions and proposals laid before us, to adopt without any drastic modifications the new scheme prepared with so much care, and after an expenditure of a vast amount of arduous labour by the education committee, who, I can assure you, gentlemen, have, during this last summer, proved themselves veritable gluttons for work. To us it is a gratification to know that a practically unanimous chorus of approval from our instructors has sped our new propaganda to the hands of those for whom it has been drawn up, and so far I have heard nothing but the most favourable expressions from those architects and others who have in the past shown so much solicitude in our educational work."

Mr. Balfour further records that, of those who present themselves for enrolment in the schools, a considerable percentage have to be rejected because of deficient education. He upholds examinations "as affording more or less of a guarantee to the public that the architect they employ has, at all events, a rudimentary knowledge or acquaintance with some of the practical essentials of his calling."

## Social Status.

Mr. Balfour derives—why is not very clear in this democratic age—considerable consolation from the fact that many of the students are of a better social status than heretofore—indeed, we believe they boast more than one title amongst them. On this subject he says:—

"In the last few years, and curiously coincident with the inauguration of our Day School, it has been brought to one's notice—indeed, it is patent to us all—that our profession, through the medium more especially of this Association, is being recruited from a section of the community of a better social status. That is a feature which we all welcome gladly. We hear a good deal about the proper recognition of our calling by the Press and public. It is far too trite a subject for discussion here, so I will merely say this, that if our profession does not meet with its proper deserts, we and *not* the public are to blame, and it lies with us to see that we only admit to our schools men who will be well calculated to uphold the dignity of the Art of Architecture. Our day school students come for the most part from the great public schools, and are often graduates from our Universities. But that alone, of course, is not necessarily any guarantee of their suitability."

In former days the general all-round artistic feeling of the students may not have been as high as to-day, nor possibly were they as well educated in some respects, but, at all events, they produced numbers of men, even amidst the lower social status Mr. Balfour is so glad to improve on, notable as architects, true artists, men who had a sound grip of their art. We should like to see all architects and students gentlemen in the best sense of the word, but candidly we are sorry to find the President strike such a note. Fancy a Professor of the "Ecole des Beaux Arts" basing his hopes of the future on the improved social status of his pupils! It sounds a trifle snobbish.

## General Education.

Mr. Balfour strikes a truer and better note when he comes to deal with the subject of the deficient general education of so many of our architectural students. He says that at the R.I.B.A. exams, "he was greatly surprised at the remarkably poor standard of general education evidenced by those who presented themselves for the preliminary test. Now, a boy who comes up for this examination is presumably one who has left school and is about to enter on his professional career. I would like to ask him how he expects in the future to find time to make himself conversant with those common facts that in so many instances he omitted to imbibe during his school days. Certainly 'Architecture' will never substantiate its claim to be embraced within the ranks of the 'learned professions' if we accept as embryo members young men who come to us with educational qualifications of such a lamentable order. Now, gentlemen, Mr. Maule, the head of our day school, whither, as I have said, most of our students come direct with the lustre of a great public school or the 'Varsity, often finds much deplorable evidence of inefficiency in the most elementary general knowledge, and much ignorance of the most ordinary attainments requisite to enable a man to occupy even a humble station in the ranks of the profession he is anxious to join. It would be interesting to know if, in other spheres of professional life, the same disabilities are to be found among those who seek to enter them.

"I cannot for one moment entertain the idea that guardians and pedagogues really deem the profession of architecture a suitable dumping-ground for the dunces. Now, I happen to be well aware that under the tuition they receive here our students, without loss of time, prove themselves in almost every case to be as able, intelligent, and enthusiastic a set of fellows as I think you could discover in almost any other educational establishment of a like nature. That being so, and I say it without fear of contradiction, it seems to me that we are entitled to make a grave indict-

ment against the education which the better-class schools of this country offer, and the training they provide. The scholastic upbringing in many of these expensive establishments is very often infinitely less suitable to fit a boy for his pilgrimage through life than the practical broad and commonplace foundation of general knowledge which our board schools inculcate. I could give you amazing examples of incompetence from some of those who seek admission within the portals of our schools, armed with the recommendations and testimonials from their late headmasters. Surely one feels entitled to expect that such documents should, at all events, be a fairly accurate representation of facts, and more or less a guarantee that their late charges have some sort of proficiency in matters of common knowledge. At the present time, Mr. Maule often finds it necessary to give the candidate for admission to our School of Architecture a negative reply, or the option of spending another year of his life in seeking general information before he begins to specialise here."

#### Lady Architects.

In 1893, by a very decided vote, the Association refused to admit ladies to membership. But, says the President—"Since 1893, however, times have changed; the female sex has, with its charming insistence, ingratiated itself into many spheres which have hitherto been regarded within the sole prerogative of man. Even the R.I.B.A. has admitted ladies within its jealously-guarded portals of membership, they have invaded the offices of many architects, and from what I can gather, all the prophecies of disaster have remained unfulfilled. On the contrary, my inquiries convince me that the converse is the case, that more steady work is the result, and that the beneficial restraint that a woman's presence commands, has elevated the tone of those offices. It seems so often forgotten that when members of the other sex are ready and anxious to quit the unobtrusive duties of the domestic hearth (and, being a bachelor, I yield to no one in my belief that this is their most charming vocation), and are prepared to embark on the uncertain and generally troubled waters of an office life, they must, of necessity, be endowed by nature with such qualifications of determination and self-reliance as will enable them not only to take care of themselves, but have regard for the welfare of those with whom they are brought in contact. There are, I believe, many of our members who share my views on this matter, and I can name at least one architect of eminence who sternly refuses to capitulate to the blandishments of the Council and join our ranks, until he can enjoy with the fair sex equal advantages of membership. Perhaps I ought to add that my distinguished friend is, like myself, a bachelor. We welcome ladies to our meetings; our conversation without their presence would be an entertainment of intolerable gloom; at times they have been known to grace our spring and summer visits with their presence; and yet when they sigh to partake of the more serious side of the Association's work you sternly and even brusquely refuse to listen to their appeals. Surely the electorate of to-day in this Society cannot be misogynists, with such hard and unrelenting natures as the electorate of thirteen years ago! I believe that if we took a vote on the subject now, we should find you all prepared to adopt the fashionable 'open door' policy, and be ready and anxious to welcome, metaphorically speaking, of course, the fair intruders with open arms."

#### The London County Hall.

The President went on to speak of the decision of the London Council, to throw open to foreign architects the competition for the great new County Hall for London. He protested that "all, or nearly all, British architects are ready to recognise the merit in the noble modern buildings we see on the Continent and the United States of America, but in this instance I think we have some justification in expressing our dissent from the decision of the County Council. The County Hall has not, and never can have, any international significance. It is to be a building from which the administration of the affairs of London will be conducted, and a home for those whose duty it is to see to its thousand needs. It is to be a structure for London alone, and London only. All English architects will com-

mend heartily any steps which the County Council can reasonably take to secure a design of the greatest possible merit, but I feel convinced that in London we want—and, gentlemen, I am equally convinced that we intend to have—an edifice which interprets for us the great heritage of our national architecture. We desire in these days to see no alien structure, no matter of what magnificence, set down to face the quiet serenity of our Palace of Westminster and the very heart of this great Empire.

"A British brain must conceive this great new building, and British hands must alone bring it into being. I trust I am no 'little Englander,' but I would ask the London County Council, the educated citizen of London, or that particularly common-sense and level-headed member of the proletariat, the 'man in the street,' whether any of them have for one moment contemplated the possibility of our having raised up for our edification across the river a structure resembling, for instance, the grotesque design for The Hague Palace of Peace, as a monument to the taste of our municipal government, and as an everlasting protest by them against the incompetence of our own architects, and as an object-lesson to us of what they deem the highest form of our art. I very much fear that the County Council in their collective capacity, have not as yet recognised a due appreciation of the broad national characteristics and constituents of our calling which go to form the history of its particular evolution in this land, and still less those subtle phases and delicate variations which invest its study with such infinite charm to the architect himself and to the educated portion of the community. Is this natural solicitude of ours for our own particular national type of architecture an effete product unworthy of consideration at the hands of the Councillors?"

Surely this is an argument which applies equally well to the employment of English architects in Ireland!

#### TRADE.

##### Portland Cement.

Messrs. Brooks, Thomas and Co. have lately received a big cargo of "Red Lion Cement," a very well-known London Portland cement of high quality, for which they are agents.

##### Irish Made Bricks.

The Durrow Brick and Tile Company are now turning out some excellent red-pressed facing bricks, which they make in three qualities. They make this brick in quite a large variety of ornamental shapes and forms—bull-nosed, chamfered, roll moulded, ovolo, ogee, splayed and throated ogee, steps to same, and other shapes. We understand the company will gladly send samples to any architect or builder requiring same.

##### Bourtree Hill Pipes.

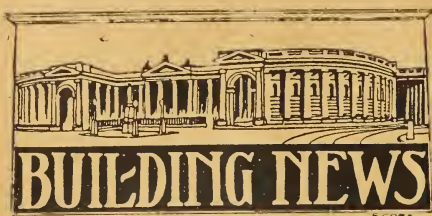
There are no better drain pipes made than extra-glazed Bourtree Hill drain pipes, for which Messrs. McFerran and Co., of 12, 13, and 14 Tara Street, are agents. Very large stocks of these pipes are held, and they are tested to a pressure of 30 lbs. to the square inch.

#### TENDERS.

The following tenders have been accepted for works under the plans of Messrs. W. H. Hill and Sons, architects, Cork—Building and completing a pair of semi-detached villas at Gillabey, Cork; W. J. O'Mahoney, builder, Magazine-row, Cork, £1,125. Building and completing a pair of semi-detached villas at Sunday's Well, Cork; John Delaney and Co., builders, Cork, £960. Building and completing teacher's residence, Sunday's Well, Cork; Frank Dolan, builder, Queenstown, £375.

Messrs. Doulton and Co., Ltd., have been awarded a Diploma of Honour and the Grand Prix at the Milan Exhibition in the Hygienic Section for sanitary appliances.





**Armagh.**—The Armagh Synod have under contemplation the erection of a new diocesan hall.

**Ardara.**—The Lord Bishop of Derry and Raphoe and the Ven. Archdeacon of Raphoe preached on Sunday at the reopening services of Ardara Parish Church. The renovation of the picturesque old church has been effected with great success by the contractor, Mr. John Bloomfield, jun., Brookeboro', County Fermanagh, from the plans of Mr. R. E. Buchanan. The improvements are of an extensive character, involving practically the remodelling of the building, and equipping the parish with a church of neat and artistic appearance.

**Ballymahon (Co. Longford).**—On the 26th ult. the opening of the new church of St. Matthew took place at Ballymahon. The new building from the back of the chancel to the front wall, measures 120 ft. In width it is 80 ft. across the transepts, and 30 ft. in the nave. The tower in the south-west front is 110 feet from the ground. The church, which was designed by Mr. T. F. McNámará, of Dublin, is built of grey hammered stone, and faced with white cut-stone from Ross, Tullamore, and Newtowncashel. The roof is supported by seven moulded and wrought pitch-pine principals in carved models. The work has been carried out by Mr. Patrick Kelly, of Longford.

**Bray.**—At the last meeting of the Urban Council, it was mentioned that Mr. T. P. Bradshaw, Mount Temple, Clontarf, wrote asking the Council to revive the efforts made, without effect, a couple of years ago, to provide a public library for Bray. Mr. Plunkett spoke in favour of the project, and expressed the hope that if Mr. Carnegie were written to again he might be moved to give a contribution. Mr. Lee also spoke in support of the project, and moved that the Library Committee be recalled into existence, with Mr. Plunkett as chairman. It was decided to re-appoint the Library Committee.

**Clonmel.**—Mr. Alfred Price, L.G.B. Inspector, held an inquiry in the boardroom of the Clonmel Lunatic Asylum into an application by the Committee of Management of that institution for a loan of £2,000 for the installation of an electric lighting system; £2,400 for new buildings, and £230 for heating the institution. There was no opposition to the application of a loan for the buildings.

**Carlow.**—At a meeting of the Carlow Urban Council, the chairman stated that several communications had passed between the Council and Mr. Carnegie in reference to the free library project. Mr. Carnegie had promised a grant of £1,250 provided a sum of £500 was raised for the upkeep of the library, and a rate of 1d. in the £ guaranteed. As a result of the action of the Most Rev. Dr. Foley, Mr. Carnegie had come forward with an unconditional offer of £950. A committee was appointed to take steps in the matter.

**Castleknock.**—A new billiard room, several bedrooms, and other extensive structural alterations are at present being carried out by Mr. Wm. Beckett, Percy-place, at Ashton Lodge, Castleknock, the residence of Major H. C. Dugdale. Messrs. Maguire and Gatchell are also engaged in laying down a new sanitary, plumbing, and drainage system and gas installation. Mr. Edwin Bradbury is the architect.

**Co. Wexford.**—A new church at Oulart, Co. Wexford, will shortly be commenced for the Rev. P. Kenny, P.P. Plans are being completed by Mr. George L. O'Connor, M.R.I.A.L., 108 Great Brunswick-street, Dublin.

**Co. Wicklow.**—The Wicklow Urban District Council invite tenders for altering, enclosing, and repairing 16 cottages on the Wicklow Murrough, according to the plans and specifications of the Town Surveyor. Tenders close 10 a.m. November 6th.

**Dublin.**—The premises of Messrs. Kapp and Peterson, Grafton-street, are about being rebuilt from the designs of Mr. George P. Sheridan, A.R.I.B.A., Suffolk-street, and Mr. S. Bolton is preparing the bills of quantities. The adjacent premises of Messrs. Ponsonby, the well-known booksellers, are also about to be rebuilt, Mr. L. O'Callaghan, South Frederick-street, being the architect. Mr. Bolton is also the surveyor for this work.

Some extensive works of renovation have just been completed at the R.C. Church Fairview, Messrs. W. H. Byrne and Son being the architects.

The houses erected at Sandymount by Messrs. T. Connolly and Son, to which we referred in our last issue, are from plans prepared by Mr. J. Dougan, C.E.

Some important alterations are at present being made to the Rotunda Hospital. For a considerable time past the accommodation provided by the existing buildings have been found very inadequate, and an enlargement scheme, therefore, became absolutely necessary. It has taken the form of a new wing, and the work of erecting it is proceeding at such a rapid pace that the extra space which it affords will shortly be at the disposal of the hospital staff. The new wing is built on the site of the old colonade and patients' entrance on the west side of the existing building. The new wing has been planned on a style to harmonise with the other buildings. It is constructed along the curve of the old colonade, the frontage consisting of granite, and adds to the general appearance of the institution. The work was designed by Mr. Albert E. Murray, F.R.I.B.A., A.R.H.A., Dawson-street, Dublin. On the ground floor there is a spacious entrance hall for the admission of patients, this apartment replacing the former porch or lodge, which had been found inconvenient and unsuitable. A direct passage leads from the entrance to the lift, which will be found most useful for the conveyance of ambulance cases to the ward's. Accommodation is also provided on this floor for the resident doctors, their assistants, and for the female students. The three upper storeys are divided into apartments for the nursing staff and the Lady Superintendent, storerooms, linen closet, etc. There are about fifty rooms in this portion of the building, and each floor is self-contained. There is an entrance from the main hospital to each of these floors, and also a stone staircase leading to the roof in case of fire. The roof is flat, and is capable of being converted into a garden. Fire-proof materials have been used throughout. The heating arrangements are of a complete character, radiators being installed on each floor. By the transfer of the nursing staff to the new wing a number of spacious apartments will become available for use in the parent building, and these it is proposed to form into wards capable of accommodating thirty or forty extra beds. The general contractors are Messrs. B. White, Summerhill; Messrs. Homan and Rogers, Manchester, contractors for the whole of the constructional steelwork, fire-resisting floors, and flat roofs; and Mr. Howard MacGarvey, Lombard-street, is responsible for the plumbing and heating apparatus.

Messrs. Collen Bros., Ltd., 5 Clanwilliam-place, Dublin, have secured the contract for the erection of a new store in Park View-lane and a new shop in Great Brunswick-street, for Messrs. Wm. Preston and Co., Ltd., wholesale oil and colour merchants. The plans were prepared by Messrs. Miller and Symes, architects, 60 Dawson-street, under whose supervision the work will be carried out. Bills of quantities were prepared by Mr. J. Graves Clayton.

Mr. Patrick Short is engaged upon alterations and additions to the Sheriff-street premises of Messrs. P. Macken and Co. Plans and specifications by Mr. George T. Moore, A.R.C.S.I., Foster-place, Dublin.

Mr. James Kieran, Talbot-street, is building new warehouses at 75 and 76 Marlborough-street, Dublin, for Messrs. Hickey and Co., 23 North Earl-street, according to the plans and specifications of Mr. George L. O'Connor, M.R.I.A.L., Great Brunswick-street, Dublin.

New premises are about to be erected in South King-street for Mr. S. T. Robinson, and tenders have been invited. The designs and specifications are by Mr. W. Cramwell Wilson, Malahide, and Messrs. Beckett and Metcalfe, 10 Leinster-street, are the quantity surveyors.

**Downpatrick.**—A bazaar was opened in the Assembly Hall, Downpatrick. The object of the bazaar is to raise funds towards the cost of building a new Masonic Temple, so that the three lodges and the Royal Arch Chapter may meet in the same building. The members had already subscribed £400.

**Enniskillen.**—The County Council have favourably considered the plans for the alteration of the Courthouse prepared by the county surveyor.

**Limerick.**—The great event of the golden jubilee of St. John's Cathedral was carried out on Sunday week in ecclesiastical and civic state. The ceremonies of fifty years ago were all brought to light in a very interesting way. The front of the cathedral was beautifully decorated with flags of every design and colour. The concourse of people was enormous, and were animated with utmost enthusiasm. The night illuminations were very effective. Through the pointed apertures of the tower, provided to give access to the balcony, there hung two electric lamps, that in cast-

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ing their sheen downwards over the mighty pile, showed a revelation of Gothic art that surpasses anything of its kind in Ireland. In silvery brightness came forth every cornice and canopy, and defining every line and curve of the great window underneath, together with every intricate nook and angle, so scientifically treated in this great work. Above the lamps nothing was seen but the gloom of an October night. Nevertheless there was in existence there a stupendous mass, towering skyward to a height of 281 feet from the ground, not taking into account the cross fixed overhead. St. John's tower and spire is the work of Mr. M. A. Hennessy, architect, formerly of George-street, but at present in Cork. It reflects credit on him for all time, and is the admiration of every visitor to this city. The cathedral is from the design of Mr. Hardwick.

The sub-committee appointed to look into the question of the acquisition of a site for the proposed new Technical School for Limerick, reported on the 23rd that they had two offers, one from Mr. Ebrill at 23, 24, 25, and 26 Thomas-street, and another from Mr. Roche, Dublin, at the juncture of Cecil-street and Thomas-street. Neither of these were accepted, and the Mayor was asked to approach Mr. Barrington with a view of obtaining from the Earl of Limerick a free site in the People's Park. If the institute comes into existence, the Department have promised to aid the committee to the extent of £300 a year to pay off interest of sinking fund on loan. If the site is got in the Park it means that a new and handsome building will be erected, besides the benefit to the working classes of disbursement of the money.

**Roscrea.**—The directors of the Roscrea Bacon Factory, Ltd., have decided upon the erection of a new bacon factory at Roscrea, and tenders have been invited for the following:—(1) Excavations, foundations, concrete floors, and walls; (2) corrugated iron buildings, or alternatively buildings with Belfast felt roofing. Tenders to be lodged with the secretary, December 1st.

**Sixmilecross.**—The directors of the Great Northern Railway are prepared to receive tenders for the erection of a Station Master's house at Sixmilecross Station. Tenders should be delivered on Monday, the 5th November.

**Sligo.**—A new Diocesan School is about to be erected in Sligo for the Incorporated Society, according to the designs and specifications of Sir Thomas Drew, R.H.A., Clare-street, Dublin. Messrs. Laverty and Son are the contractors. The quantities have been prepared by Messrs. Beckett and Metcalfe, 10 Leinster-street, Dublin.

Works upon an extensive scale are being carried out under the supervision of Mr. J. C. Wilmot, C.E., M.R.I.A., 3 Lower Merriam-street, Dublin, upon the following estates:—Co. Wicklow—Quinn estate, Bray.—A road has been opened up 600 feet long by 40 feet wide from Albert-avenue to Navarro-terrace, and it is expected trees will be planted along this thoroughfare to add to its attraction. Eight villa houses in the Domestic Gothic style, at a cost of about £600 each, have already been erected. Dublin.—Howard estate, North Strand.—Some thirty to forty cottages have recently been taken down, and extensive rebuilding is going on, consisting of shops, two-storey houses, and cottages. When finished, an outlay of about £8,000 will have been expended on the estate. Smith estate, Palmerston Park.—A road 40 feet wide is to be opened up, stretching from Cowper-road to Palmerston Park. Building has been commenced. It is estimated an outlay of about £20,000 will be expended in carrying out this work.

The M'Caughey Hotels and Restaurants, Ltd., of College-street, Dublin, are at present engaged in making large extensions to their Pitman Hotel, Corporation-street, Birmingham, and it is pleasing to note the contract has been secured by Messrs. M'Loughlin and Harvey, Ltd., of Dublin, Belfast, and London, in competition with several Birmingham firms. The entire work is carried out from the plans of Mr. Edwin Bradbury, Dublin.

## OUR ILLUSTRATIONS.

### Messrs. M'Cullagh and Co.'s New Premises, Castle Place, Belfast.

The new building is in the style termed *l'Art nouveau*, and forms quite a new and striking feature in the architecture of Belfast; it has 4½ storeys in height, and is of steel construction. The first two storeys are devoted to shop space, and show-rooms, work-rooms and stores being above from the ground to the first floor. At each end are handsome granite pilasters, and the windows, which are polished plate-glass, have clinch and upright bars of polished brass, with ornamental caps and bases of copper. The upper portion of the windows is filled with mahogany tracery work, as are also the windows of the storey above, the glass in these being bevelled. The two entrance doors are of mahogany, with antique repoussé copper panels. The upper portion of the building is of "Carrara" ware of a soft cream colour, relieved by enrichments of the palest green, and is formed by arches springing from the tiers below, which are of a brown shade, and rise from the granite at each end, with two intermediate tiers rising from the first floor level, all of which are square up to the second storey, and then take a half octagon shape and continue up to the top of parapet, each one terminating with a flag-staff. Each of the three arches have bold mouldings, with four enriched green voussairs, from two of which two additional octagonal tiers rise, and the enriched spandrels of which are also green. The main cornice, which has a projection of eighteen inches, from the sill of the fourth storey windows, and is returned round each half octagon, being supported by projecting moulded corbels from below, and at the three centre windows the projection is increased to three feet, ornamental wrought being placed round these.

The central arch carries the gable, which rises to a height of seventy-four feet from the footway. This gable has a circular window, above which are the date stones, the moulded coping terminating at either side with large volutes. A pleasing feature at the bottom of the gable is the panel, in three sections, forming a frieze of skilfully modelled pomegranates and foliage. The name of the establishment, "Castle Buildings," is handsomely introduced at the third floor, level at each side, with the name of the firm in the centre, the whole forming a frieze, the letters being raised, and executed in Potter's gold on a cream ground, the moulding at top and bottom being brown, and blending with the ornamental enriched caps of the tiers, which terminate at this level. The porches are laid with marble, in squares of black and white, and a white marble border, three feet wide at rere of footpath, runs the entire length of the building. The principal entrance is in the centre, and the floor of the shop is of a dark red tint. The ceilings are divided up into panels, with Anaglypta decoration in bold relief, the frieze being of similar decoration; and the ceilings of show-rooms on the floor above are all similarly treated. The columns are finished with octagonal bases and enriched capitals.

The grand staircase, by which the upper floors are reached, is of unique design. The carved balusters are arranged in groups, and, together with the arcadiz at the top of the stairs, and finished in cream enamel, the handrail and intermediate rail being of polished mahogany, as are also the newel posts at bottom, which support wrought copper electric standard lamps; the repoussé copper panels, introduced at the base of the posts, harmonising with the lamps above. The building is equipped throughout with electric light. The rere of the shop is excellently lighted by two ceiling lights, which also light the private offices. A fireproof stair rises at the rere to the top of the building, with access to each floor.

The contractors were Messrs. McLaughlin and Harvey, who have carried out the work in a highly satisfactory manner, according to the designs, and under the superintendence of the architects, Messrs. Blackwood and Jury, M.R.I.A., of Donegall Place.

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# ENGINEERING SECTION.

## ITEMS.

We are informed that Mr. William B. Bryan, Chief Engineer to the Metropolitan Water Board, has been elected President of the Junior Institution of Engineers for the forthcoming session. He succeeds Mr. Dugald Clerk.

\* \* \* \*

Should any of our readers be in want of a house to represent them in London we can put them in communication with an engineering firm who have good offices in Queen Victoria-street, E.C. The firm in question is prepared to represent substantial and enterprising firms manufacturing some speciality in the mechanical, heating and ventilating, laundry, or cooking lines. Letters addressed "London Representation," c/o this office, will be forwarded.

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A curious proof of the inaccuracy of the daily Press in dealing with structural works was adduced in the accounts of the recent accident outside Dover Harbour. One paper described how a Swedish steamer crashed into the piling of the works of the southern breakwater, and caused serious damage to the harbour works, two buoys of which were carried away. Another stated that the steamer crashed into the southern breakwater works, and the details furnished would lead the reader to imagine that the harbour wall had sustained enormous damage. As a matter of fact, the injury occurred only to the staging erected by the contractors for the completion of the work. The breakwater itself is a massive concrete structure, faced with granite, which would bear an impact from the largest vessel afloat without in any way being seriously impaired.

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In large engineering works it is now customary to install cable transporters for the rapid and economical conveyance of material. A recent fatal accident is a reminder of the necessity of carefully calculating the strain on the end towers during the passage of heavy weights. A new service reservoir is in course of construction for the Metropolitan Water Board at Honor Oak, and to aid in the work two iron framework towers 65 ft. high and 700 ft. apart, with a wire cable slung between, had been erected for the contractors by Messrs. Henderson and Co., of Aberdeen. When the towers were completed a man named Sharpe mounted one of them to watch the transference of the first load of 1½ tons of concrete. This had travelled but a short distance when the tower upon which he was standing was torn out of the foundation and overturned, killing the man instantly. From all reports, it would appear that the anchorage was insufficient, and that the structure was not fully tested prior to being brought into use.

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The Macroom Rural District Council recently threw an interesting sidelight on the methods by which the Irish roads are, in some districts, maintained. The County Surveyor, Mr. Longfield, asked for a sum for steam-rolling a portion of the main roads in the vicinity of Macroom, citing the successful result of this treatment in Waterford, Limerick, and Tipperary, both with regard to comfort and economy. The arguments against the proposal were, to say the least of it, unconvincing. One member said that an expenditure of £75 for the rolling of 30 miles of main road was extravagant. Another was of opinion the money should be expended on the labour of the country. A third Councillor considered that steam-rolling would be of no use to them, while a fourth expressed fears for the safety of the gulleys if this revolutionary method of road maintenance was adopted. Even the chairman's statement that the ratepayers would be saved at least 20 per cent. in the cost of the upkeep of the roads had no effect on this extremely conservative body, and the consideration of the matter was adjourned for three months. The district which this Council is supposed to control is a tourist centre, and to the cyclist and motorist a proper road surface is the greatest of attractions. Therefore, from a monetary point of view alone, it might be thought the proposals of the County Surveyor would have been unanimously adopted. But playing to the gallery is too favourite a pastime to be lightly abandoned, and the time-worn theme of helping the labourer drown every note of common-sense. Arguments supported by facts and figures are scarcely listened to by

Councillors whose obstinacy is often only equalled by their utter ignorance. So the roads of Macroom will still be "darned" at the leisurely convenience of some local road contractor; the road-users will still grumble; the tourists will still anathematise Irish roads and all those responsible for them, and the Councillors will undoubtedly feel proud that they have struck a deadly blow at such an innovation as a steam-roller, which it is possible very few of them have even seen. Oh, the pity of it all!

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In our last issue we commented on the probable destruction of trees along the London Embankment by reason of the laying down of the London County Council tramways. We note in the columns of the "Architectural Review" that Mr. Waller Crane voices his indignation at such an utter act of vandalism. It appears that there is a Parliamentary instruction that the tracks are to be set only three feet away from the kerbs, though no reason is forthcoming, and despite the fact that such regulation has been followed in no case elsewhere. By such action not only will the roots of the trees be materially damaged, but if double-decked cars are used, the branches will have to be lopped to such an extent as to entirely spoil the appearance of the beautiful belt of trees which have now become such a valuable possession to the citizens of the English metropolis. And what a valuable asset to a city is the shaded walk and carefully-planted boulevard. In Dublin and the majority of Irish cities this aspect of civic responsibility is practically lost sight of. It is, therefore, doubly pleasant to hear that a body has been formed to plant some of the Dublin streets in the near future, and doubtless when the intention is being carried into effect assistance will, as in former times, be rendered by the Crown by the presentation of a number of small trees suitable for street-planting. The initial difficulty is often that of selection, the atmospheric and general conditions, soil, and proximity to the sea all having important bearing on the life and growth of the trees. Mr. Francis Smythe, the Borough Engineer of Finchley, who has had long experience of arboriculture as applied to municipal work, considers that planes, Norway maple, sycamore, poplar, and ash are the most suitable trees for manufacturing centres. For seaside towns the following are found to thrive:—Sycamore, Norway maple, Turkey oak, Camperdown elm, grey poplar, white willow, and the common ash. Plane trees are probably the best suited for general planting, except in exposed positions, as they will grow in almost any soil, and the beauty of their foliage and their symmetry are difficult to excel. One important point to be remembered is that trees which shed their foliage early are the most desirable for those city streets which are lit by electric arc lamps on high standards. Otherwise very heavy shadows are cast, and the illumination of the thoroughfares is materially affected. In streets lit by gas at a lower level this consideration is not so important.

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The general practice is to purchase trees with a clear stem of 8 feet, with a minimum circumference at the bole of 6½ inches. The ground should be prepared by excavating a hole near the edge of the footway 4 ft. long by 3 ft. wide and 3 ft. deep, into which is placed a cubic yard of good vegetable soil, with some manure. Into this the young tree, which should have plenty of root fibres, should be set so as to be not more than 12 inches below the surface of the ground. The soil should be well trodden down around the tree, which should be staked by a larch pole 14 feet in length, to which it may be secured by wire over a slip of canvas or tarred felt. The best period for tree-planting is between November and the middle of February. It is to be hoped that on the fast approaching Arbor Day many Irish municipalities will avail themselves of the opportunity of cheaply and permanently beautifying the thoroughfares in their keeping, realising Southey's dream, in which "Broad-leaved plane trees in long colonnades o'er-arched delightful walks."

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Mr. Edward A. Hackett, the County Surveyor of Tipperary, in a recent letter states that the application of tar to roads for the purpose of making them dustless fails for several reasons. The tar in wet weather becomes diluted with water, producing an offensive black mud, which is carried on people's boots into dwelling-houses, injuring



carpets, etc. It is eventually washed away by the rain. In dry weather it is found that the tar adheres to particles of dust and flies about. For these reasons Mr. Hackett intends to try an experimental process by dry rolling the stones when re-making the road, and then, at an early stage, before the interstices in the stones are filled up, to apply a coating of tar and lime to fill them, subsequently coating over with chips or fine gravel, and rolling smooth. The surface obtained would be similar to that frequently used in the construction of footpaths, in which a mixture of one load of fine gravel and two barrels of lime is made into a stiff paste by the addition of tar as it comes from the gas-works, and then all beaten into a smooth surface. While such a treatment would doubtless be dustless, and of such a nature as to afford a good foothold for horses, it is extremely probable that it would suffer severely from heavy traffic on a hot, sunny day, when the surface would become softened. We, however, hope Mr. Hackett, whose excellent and up-to-date management is proverbial throughout Ireland, will find an early opportunity to make his experiments, and that they will prove as successful as he anticipates. The subject of dustless roads is one of the utmost importance, and the engineer who first thoroughly solves the problem will have brought us all a considerable step nearer Utopia.

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It was a matter of great surprise to many to hear from Colonel Hellard, R.E., Director-General of the Ordnance Survey, in his evidence before the Royal Commission on Coast Erosion, that during the last thirty-five years a practical addition of 30,000 acres had been made to the rateable area of the United Kingdom. Two-thirds of this acreage had been gained by Lincolnshire, Norfolk, and Lancashire. This gain is chiefly due, as may be expected, to numerous effectual reclamation schemes, but we venture to opine that there are few engineers who considered that the reclaimed land would so greatly exceed the losses by erosion. However, the news is good news to all, except, as *Punch* said last week, to the Little Englander.

## IMPORTS.

### PORT OF DUBLIN.

October 17th—Per Lady Roberts, from London, 700 sacks cement, R. Martin and Co.; 200 sacks whiting and 37 pkgs. Dinorwic, T. and C. Martin, Ltd.

October 20th—Per City of Malaya, from Antwerp, 20 cases window glass, Plate Glass Co.; 70 cases do., Hoyte and Son; 24 do., A. Bassi; 30 do., W. Collins; 31 do., J. Arizho; 215 do., T. Dockrell, Son and Co., Ltd.; 70 do., to order; 47 bdls. steel bars, 243 steel joists, 1 case slates, 41 bags cement, 1 case plate glass, to order.

October 20th—Per City of Malaga, from Antwerp, 20 cases glass, to order; per Dania, from Fredrikstad, 99,651 pcs. flooring boards, 12,728 do. scantlings, W. and L. Crowe, Ltd.

October 25th—Sarah Jane, from Bridgewater, 115 tons bricks, etc., J. McFerran and Co.; per Velinheli, from Port Dinorwic, T. and C. Martin, Ltd.

October 27th—Per Lady Hudson-Kinahan, from London, 1,000 sacks cement, T. Dockrell, Son and Co., Ltd.

October 29th—Per Bengore Head, from Montreal and Quebec, 36,615 pks. firwood sawn, to order; per Black Head, from Riga, 32,439 pcs. firwood sawn; a quantity lathwood; 6,007 sleeper blocks, to order.

The Eastwood, Greasley, and Brinsley Joint Committee, after visiting various sewage works, and having tried many forms of revolving sprinklers at their outfall works, placed orders with Messrs. George Jennings, Ltd., Hydraulic Engineers, London, for the entire apparatus required. This comprises new improved patent revolving sprinklers, 60 feet in diameter, with dosing gear, the construction of which shows a distinct departure from other methods. The apparatus superseded was condemned owing to its joint or seal leaking, whereas this firm's machines have neither joints nor seals to become leaky, the only wearing parts being so designed as to permanently maintain their efficiency in use.

## DEMONSTRATION OF CEMENT STONE MANUFACTURE.

On Tuesday last, at the invitation of Messrs. George Rome and Co., our representative visited their works at Clanwilliam Place, where a special demonstration of the capabilities of the "Hercules Cement Stone Machine" had been arranged for. Our readers will recollect that some time when reviewing an American work on cement stone manufacture, we ventured to express doubts as to the ultimate advantage, either in cost or in appearance, of cement blocks over ordinary concrete made in the usual way. It was to counteract views such as these, which are not uncommonly held, that the demonstration in question was organised at 5 Clanwilliam Place, when a number of gentlemen interested in the subject attended, and followed the course of the demonstration. It is claimed by the promoters of these machines, that the process is cheap and effective, and that the products are slightly and in every respect useful and durable. As already noted in previous articles, quite a number of different classes of machines are on the market, that which Messrs. Rome are interested in being the "Hercules" Cement Stone Machine, made by the Century Cement Machine Co., Westmait St., Rochester, N.Y. The "Hercules" is specially made for the purpose of producing cement stone of high quality. If desired, the effect of cut stone, rack-faced stone, and so on, may be given to the artificial stone produced by this process, and at a far less cost than either brick or stone.

The process is a very simple one, and consists of merely filling and stamping the moulds, which are the principal parts of these machines. The machine itself is known as the "Tamp-on-the-face" method. The concrete having been mixed suitably (Messrs. Rome use it fairly dry), there is first placed in the mould, around the surface of the outer face on the block, a thickness of fine stuff, about one inch thick; then the ordinary stuff is shovelled in, and displacer moulds inserted, which save material and also cause the block to be cast hollow; when the whole has been trampled well in position these are withdrawn, the mould unclamped, and the casting released and lifted away. To secure the best results, some three weeks should be allowed the blocks to ripen, during which time they should be kept well wetted.

Outfits are supplied with each machine, enabling lintels, sills, strings, bands, and rock-faced or plain-chiselled blocks and quoins to be cast with great rapidity. In addition, moulded work of every description can be worked without difficulty. Some of these ornamental moulded and enriched strings and cornices which were shown us are very finely wrought, and the faces and arries perfect; in fact, it is difficult to believe they are castings at all, so true are they. The machine makes blocks up to 6 feet long by 15 inches high, and 24 inches wide. There is an enormous variety of work which can be done by means of cement stone machines.

There can be no doubt but that in any district in which stone is difficult to obtain and costly to work, that there is a big future before such machines.

The process of demonstration was carried out by two labouring men, who, we understand, were not long accustomed to the work; but we are told that with a larger staff of men, familiar with the work, blocks may be turned out with extraordinary speed, as was done in the case of Letterkenny Presbyterian Church last year. The method employed seems to be simplicity itself.

The makers lay great stress upon the quality and fineness of the cement used, the mixing, grading, and tampering of the mass.

The demonstration was a most interesting one, and was followed with close attention by those present; it served, indeed, to remove a good many, if not all, of our prejudices against this form of construction.

We are sure Messrs. Rome will be glad to afford enquirers all the information they may require. A capital form of slab partition is produced by these machines, light, strong, and elastic.

## THE WATER SUPPLY OF THE CITY OF DUBLIN.\*

By M. A. MOYNIHAN, *Engineer in Charge of Dublin Corporation Waterworks.*

(CONCLUDED.)

### The Works at Roundwood.

The eduction tower is built immediately opposite the tunnel. Three 24-inch valves, with bell mouths, are placed on pipes laid through the walls of this tower. The first 10 feet, the second 20 feet, and the third 30 feet below top water level, in this way allowing of water to be drawn off at different levels, and should it be necessary to obtain water from a lower level than the 30 feet level, this can be done by opening the 33-inch valve between the 48-inch pipe and the 33-inch pipe in the valve chamber, to which I shall refer later. This 33-inch pipe is carried through the tunnel into the valve chamber (which is under the embankment), and is there divided into two branches. One leads to the circular wall which feeds the filter-beds, and the other leads direct to the clear-water delivery pipe, so that in case of the filter-beds not acting, the city could be supplied with water which, though unfiltered, would be still sufficient in quantity and excellent in quality.

The 48-inch pipe which is laid in the tunnel can also be used as a service-pipe, although it is primarily a scour, to be used if it be ever found necessary to quickly lower the level of the water in the reservoir. It is carried along the eastern side of the filter-beds, and discharges into the by-wash below them.

While the embankment was being made, the work of constructing the filter-beds and pure-water tanks was in progress.

### The Filters.

Seven filter-beds were made at the time, and two clear-water tanks. The former are each 215 feet long by 115 feet wide and 10 feet deep. The latter are 250 feet long by 150 feet wide and 12 feet deep. The filtering medium consists of a layer of broken stones, 2 feet thick, upon the top. On this bed are placed 3 strata of gravel, and on top of this a layer of fine washed sand 2 feet 6 inches thick. Sufficient land had been provided for the making of additional filter-beds, if the number already provided did not prove effective.

A few years later this precaution was fully justified, and necessity compelled the construction of additional beds, similar in area and depth to those of the original design. The head under which the filters work is 3 feet.

The necessary sand for the replenishing of the filters is procured from a quarry in the townland of Annamoe, about 4 miles from Roundwood, which was acquired by the Corporation at the time of the building of the works. Two men are constantly employed getting out and screening sand, which is carted to the beds, where it is washed by an ingeniously constructed sand-washing machine.

The cleaning of the filter-beds is a continuous process. One bed is taken at a time, emptied, the top layer of sand scraped off, wheeled in barrows to the iron tipping waggon on the bank, and conveyed to the sand-washing machine.

### The Tunnelling.

It was, however, one thing to catch the available water, and quite another story to bring it from the Wicklow glens to the city boundary. A range of hills nearly three miles in length separates the Vartny valley from the North-eastern slope that looks towards Dublin. In fact, the valley is crooked. Starting in a south-easterly direction, it turns at a right angle near Callow Hill, and here one of the most serious operations of the constructional work had to be encountered. A tunnel was the only course, and it was driven from twenty-one shafts, each 200 yards apart. A memoir written of the late Mr. Parke Neville records that the first shaft was commenced on the 4th of January, 1863, and that the last heading was opened out in September, 1866. The time required to execute the work was three years and eight months. It was carried through under circumstances of exceptional difficulty. The hardness of the rock, the irregularities of stratification, and the frequent

inrushes of water sorely taxed the ingenuity of engineers and contractors. The best steel was practically useless in the drills that were employed; in one heading a ton of steel was wasted in the piercing of 280 yards of rock-cutting. On one occasion the jumper was driven from the workmen's hands by the excessive pressure of a water-head into which it had been driven in the course of boring. This tunnel was originally contracted for on a calculation of 5 feet height and 4 feet width, and to be of an oval shape. The contractor, however, found that it was more advisable to adopt a larger scale, and it may be taken that the excavation was 6 feet in height by from 4 to 5 feet wide.

On the northern side of Callow Hill a cast-iron gauge weir was erected for the increasing of the quantity of water daily passed down to the city and suburbs. It was divided into two bays, 10 ft. in length, over which the water fell into a circular basin 86 ft. diameter and 18 ft. deep.

### The 33-inch Main.

The level of the water when the tank is full is 602 O.D., and from it a 33-inch main conveyed the water to Stillorgan service reservoir.

The length of this main is 17 miles 4 fur. 142 yards, and the falling hydraulic line is 20 ft. per mile. There are relieving tanks at Kilmurry, Kilcrony, and Rathmichael, at respectively 473 ft., 414 ft., and 341 ft. O.D. It will be noticed how very finely the gradation was calculated by the original designers.

The growth and requirements of the city, and the demands of the citizens for a fuller supply of water found answer in the determination of the Municipal Council to increase the area and capacity of the reservoir at Stillorgan. The original reservoirs, two in number, were constructed to contain 14 days' supply to the city, and this being found insufficient, the Gray reservoir was built, making the total storage capacity of the service reservoirs equal to 28 days' full supply.

### A Second Main.

Soon after the works had been completed, Mr. Parke Neville and Sir John Gray, in a joint report to the Waterworks Committee, pointed out the advisability of having a second main laid from Callow Hill to Stillorgan, the necessity for it having been proved by a bad burst which occurred on the 33-inch main in the Cookstown valley, and Mr. Neville, profiting by that experience, urged on the Committee the necessity of providing a second line of pipes, which could be used as an auxiliary whilst at the same time providing for a supply of water at high pressure to the townships of Killiney, Bray, and Dalkey. In his report, Mr. Neville pointed out that if the Dublin Corporation did not at that time (1880) feel justified in spending so large a sum of money as would be required to carry a pipe from Callow Hill to Stillorgan, £100,000, they could do portion of the work by bringing a 34-inch pipe from a junction with the 33-inch main above Kilcrony relieving tank (at Burke's, of the Cross) to the service reservoir at Stillorgan, and be thereby enabled to give a high pressure supply to Bray and Killiney, and supply the districts of Foxrock and Dundrum. Mr. Neville reported continuously on this necessity, but it was not until the year 1890 that the Waterworks Committee decided to act and carry out the further recommendations of their engineer, Mr. Hartly, who had succeeded Mr. Parke Neville, and proceed with the desired extension. Within the year that portion between Kilcrony and Callow Hill was completed.

The increased demand upon Stillorgan made it necessary to press forward the completion of the second line to Callow Hill. At the same time the Waterworks Committee were assailed by complaints as to inadequate pressure from the residents on the north side of the city. Day by day the demand for water was increasing, and the pipes which were originally intended to meet this demand were found insufficient in capacity.

\* A paper read before the Engineering and Scientific Association on October 15th.



In 1903 the Municipal Council decided to complete the second line of 24-inch main from Kilcrone to Callow Hill, and at the same time to lay a 24-inch pipe from Stillorgan Reservoir for the supply of the north side of the city. This latter line was to follow the old route as far as Donnybrook, but instead of coming thence to Leeson street, it was decided to bring it by way of Anglesea Road to Ballsbridge, by Shelbourne Road to Grand Canal Street, through Erne Street, Brunswick Street, across O'Connell Bridge, Eden Quay, Gardiner Street, Dorset Street as far as the junction of the latter with the North Circular Road. There it was to be divided into two 18-inch mains, one going west as far as the Park gate at Infirmary Road, where it was to join the existing 12-inch main. The other was taken last as far as Summerhill, where it diminishes to a 12-inch main, which is carried on to Annesley Bridge, by the East Wall, to the North Wall. The total estimated cost of this latter portion of the work was £52,000, and it has been carried out with the exception of a small section, to which I shall refer later. The class of pipe which was decided upon was that known as turned and bored.

On tenders being invited, the contract was given to that great firm of iron founders, the Stanton Iron Work Co., of Nottingham. Their contract was for 10,000 tons of pipe, and this was carried out in a manner which reflects the greatest credit upon them.

#### The Supply to the North Side of Dublin.

There is a general idea through the city, that the required increase of pressure on the north side must necessarily await the construction of the additional storage reservoir at Roundwood. This is not so, as on the completion of the new 24-inch water-main the north side of the city will have the uninterrupted service of a large water-main working at a pressure of about 220 ft. head. I may note here that the present total quantity of water taken from Roundwood averages 14,000,000 gallons daily, and the construction of this second line of pipe will supplement the existing supply by a further 8,000,000 in the 24 hours, if found necessary.

The necessary number of pipes having been delivered by the contractor, the work of laying them was commenced in January, 1904, at the junction of Gardiner Street with Dorset Street, and carried as far as O'Connell Bridge. The work was then started on the south side of the Liffey from D'Olier Street, and brought as far as the Grand Canal Bridge at Grand Canal Street, then re-started on the east side, and carried on uninterruptedly as far as Stillorgan reservoir. Owing to the fact that the streets had been of late years taken possession of by others than those who were interested in the waterworks, we had not such a free and easy course open to us as had our predecessors in the seventies.

We had to keep clear of the gas mains, and in doing so ran into the electric mains. We went on one side of the road to avoid the telephone cable, and, of course, met a telegraph cable. The only thing to do was to go under the whole lot, and we found ourselves in a sewer. The result of this state of affairs was that the work through the city was very tedious, and in places difficult.

#### A Troublesome Work.

The most troublesome piece of pipe-laying was at the junction of D'Olier Street and Townsend Street. Here we had to contend with our own 24-inch main, with all the other obstructions thrown in, plus a few tramway cables. Our only course was to tunnel for a considerable distance.

The next most difficult portion of our task was going from Brunswick Street to Grand Canal Street, through Erne Street. Here the pipes were all laid under high-water level; consequently the work had to be carried out between tides, which added very considerably to the expense, owing to the trench having to be pumped out at each ebb of the tide. The Liffey coming to us uninvited had to be helped out.

The Canal being the boundary between the city and the Pembroke Township, the sett-paved streets were done with; but if we had thought it was to be easy sailing thenceforth, we were to be disappointed. We found the macadam in some parts of the Pembroke Township and along the Stillorgan Road (Dublin County) to be in some places 3 feet thick, and the constant procession of picks to the blacksmith's

repairing shed bore a mute but eloquent testimony to the abilities of Mr. Middleton and Mr. Collen as road makers. The workmen also bore testimony to the same fact—equally eloquent, but not as mute. However, the work progressed satisfactorily and without a hitch, until Stillorgan was reached.

In the meantime the laying of the 18-inch main from Parkgate Street had started, and owing to the comparatively suburban character of the district through which the line passed, no difficulties were experienced.

The 12-inch main, from the termination of the 18-inch main at Summerhill was also laid, without much trouble, to the North Wall, and both are now complete, with all sluices and air-valves fitted, and connections made with the existing service mains. Both these pipes have been charged and submitted for several days to the Varty pressure, which they withstood most satisfactorily. To complete the portion of the scheme from Stillorgan to North Dublin, only two small sections remain to be executed—viz., to join across the Liffey at O'Connell Bridge and across the Grand Canal at Grand Canal Street.

When O'Connell Bridge was being rebuilt in 1880, three sub-ways were left in the masonry expressly for the purpose of allowing gas and water mains to be carried from the south side of the city to the north. One of those, the largest, runs immediately in the centre of the bridge, and contains the larger gas-mains. There are two smaller ones of 5 ft. by 1 ft. 9 in. section, respectively, one in the centre of each roadway. The eastern one contains the two 15-inch water mains (into which the old 24-inch water-main is divided), and the other on the west side is at our service, Mr. Hartly, in his wisdom, having taken possession of it about 20 years ago by laying through it two 12-inch iron mains, knowing that it would be required some day.

In order not to interrupt the flow of water to the point of delivery to the two 18-inch mains, it was absolutely necessary to have a pipe, or pipes, of a sectional area as large as our 24-inch pipe through this conduit. It was impossible to lay cast-iron pipes of circular section to afford sufficient carrying capacity, and at the same time have room for jointing; so it was a case of deciding between a cast-iron pipe of oval section and steel pipes.

After giving the matter careful consideration, Mr. Hartly decided to adopt the latter method. Accordingly, two 16-inch and one 9-inch steel pipe will be laid side by side through this sub-way, and thus an equal carrying capacity will be preserved. Plans and specifications were prepared, tenders were invited, and Messrs. Piggett and Co., of Birmingham, are now manufacturing the pipes, which they have guaranteed to deliver on the quays at Dublin within six weeks of the date on which they receive the order.

The steel pipes are to be of ½-inch welded mild steel, coated with Dr. Angus Smith's solution, and subjected to a proof pressure of 600 feet head of water.

The length of each pipe will be 18 feet, and they will be connected together by rolled steel collars, lead jointed in the usual manner.

They will be joined on to the 24-inch C.I. main on each side of the bridge by a 24-inch to 16-inch C.I. breeches pipe.

#### Crossing the Canal.

With regard to the crossing of the Canal Bridge, very serious difficulty presented itself. On the down-stream side there was already erected a bridge of metal pipes to carry the gas, and on the up-stream side were the lock gates, the levers or arms of which, traversing as they do a large arc of a circle, prevented the setting down of the two pipes on either side of the bridge, that would act as launchings for the arch of pipes across as near together as was done in the case of the two 27-inch water-main crossing at Leeson Street or the gas main on the down-stream side to which I have referred.

However, cross the canal we must, and at this particular point, too, going under it being, for obvious reasons, undesirable. After a careful consideration of the problem, and on submitting several proposals to the City Engineer, the plan which he approved was to run an arch of cast-iron flanged pipes across. The span is 42 feet, and the rise 10 feet. The launching for the bridge consists on either side

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of two cast-iron flanged bends of 20 feet radius, known as duck-foot bends, with a bracketed seating  $1\frac{1}{2}$  inches thick. These are to be bolted to a bed of concrete 10 feet by 5 feet by 5 inches, and the flange pointed to the main which is already laid. The joint which will be used between the flanges of those bends will consist of a corrugated brass ring covered with flannel steeped in tallow. The efficacy of the flannel and tallow ring as an hydraulic joint was demonstrated to me a short time ago, when one of my foremen showed me an iron ring covered with flannel and tallow, which he had taken from a valve that must have been at least a hundred years in use. It was as perfect as the day on which it was first used.

The laying of the new 24-inch main from Burke's of the Cross to Callow Hill was begun in November, 1904, and has been completed all but the fixing of the air-vents on the branches which had been previously laid. As I have pointed out, the city work has also been brought to the point of completion, and it may be taken for granted, barring accidents, this new line—in length nearly 23 miles—will be in full work within a month from this date. To provide against any possible shortage of supply at Roundwood, consequent upon this increased draught upon its resources, the construction of an additional impounding reservoir at the head of the old pond is about to be proceeded with. In any case, the danger has always existed that a long period of continuous drought might so reduce the stock of impounded water as to seriously threaten the supply to the city and suburbs. For instance, in the year 1894 the level in the reservoir commenced to sink on March 25th, and steadily fell until November 16th, when it touched 38.83 feet below the sill of the by-wash. As my object in writing this paper is to deal with the works already in operation, and as I have already trespassed so far upon your patience, you will readily forgive me if I do not now enter into details of this further project. Let it suffice to say that the reservoir will cover about 500 acres, the total length of the embankment will be about 2,300 feet, and its greatest height above ground level 55 feet. The level of the top of the bank will be 746 feet O.D., and that of the top water level 738 feet—or 46 feet above the level in the present reservoir. The estimated contents are 1,500,000,000 gallons.

I am keenly conscious that this is but a meagre and uninteresting account of the successive stages by which a great municipal work has attained its present dimensions and undeniable utility. Indeed, I must confess that I have had no experience in the preparation of such papers, and I am not conscious of any eloquence to which the attractions of the subject—from an engineer's point of view—could move me; yet such works have an interest that is all their own, for they touch the romantic side of our profession, and if we all do not always agree in practice with the dictum of the Greek poet, and accept the principle, *Ariston men hudor*, with Pindar, we must confess the importance of such a water-supply as that of Dublin to the requirements and comforts of a modern community.

Messrs. Helliwell and Co., Limited, of Brighouse, Yorkshire, have secured orders for their patent "Perfection" roof glazing from the following:—Messrs. Vickers, Son and Maxim, Limited, Barrow; Messrs. Palmers' Shipbuilding Company, Limited, Jarrow; Messrs. Edgar Allen and Company, Limited, Sheffield, for new foundry, pattern shop, etc.; Messrs. G. Turton, Platts and Company, Limited, Sheffield, for engineering and erecting shops' extensions; extensions for Messrs. S. Osborn and Company, Limited, Sheffield; Messrs. Craven Brothers, Limited, Redditch; Messrs. E. Green and Sons, Limited, Economiser Works, Sheffield. Also large export orders for the Cape Government Railway, Japanese Navy, and Buenos Ayres Western Railway, most of these contracts being repeat orders.

**FOR SALE**—Single Vertical Spindle Molder, 24-inch table, by Elsworth. Complete with straight fence and safety guard, ring fence for circular work, rising and falling head; countershaft and reverse slotted rings; quantity irons, etc.; £10.—229, this Office.

**Dublin.**—The Dublin United Tramways Co., Ltd., advertise in our current issue for tenders for the supply of general stores, including car fittings, iron, steel, castings, oils, paints, glass, brushes, ironmongery, harness materials, electric supplies, timber, etc., for the year ending 31st December, 1907. Forms of tender (price two shillings each), conditions, and all information can be obtained and patterns seen, at the Secretary's Office, 9 Upper Sackville-street, from 29th October to 12th November, 1906. Tenders are to be lodged before 10th November with R. S. Tresilian, secretary.

**Donegal.**—The Committee of the Letterkenny District Asylum had under consideration the request of the Local Government Board to appoint a consulting engineer of wide experience in the carrying out of water-works schemes, to inquire into and report on the whole scheme proposed for supplying the Asylum with water from Lough Salt, and with the view of suggesting, if possible, some feasible scheme at a more moderate cost. The Committee had employed local engineers to report on the Lough Salt scheme. This report had been forwarded to the Local Government Board, who suggested to the County Council the desirability of having a consulting engineer appointed to examine into the matter with a view of getting some cheaper scheme than that proposed. The County Council then left the appointment of the consulting engineer to the Asylum Committee. Mr. Edward Gallagher explained to the Committee that, having been authorised to appoint a consulting engineer by the County Council, he thought they should do so, and not retard the carrying out of a proper scheme any longer. The Local Government Board had refused to sanction a loan for the purpose of the scheme until they had before them the report of a competent engineer having experience in the carrying out of waterworks. He proposed that the Committee appoint Mr. Abraham M'C. Stewart, of Londonderry, to furnish the report required. Mr. Stewart was a gentleman of great experience in such matters, and would have considerable weight with the Local Government Board, as he had already been engaged to do work for that body. Mr. Mulhern moved that Mr. Steadman, Co. Surveyor, be appointed. Mr. William Colhoun seconded the motion. He thought as Mr. Stewart was already acting as an arbitrator for the L.G.B. he would not be an independent engineer. He considered there was no better engineer in County Donegal than Mr. Steadman, and nobody could criticise his work. Mr. William Kelly moved that they appoint Mr. Swiney, of Belfast, who was an engineer of considerable experience in the carrying out of water schemes. He did not see how they could regard Mr. Steadman as an independent engineer. Mr. Gallagher said he had no objection to withdraw his motion in favour of the appointment of Mr. Steadman. Mr. Hugh M'Cafferty thought they should first fix the salary, and then make the appointment. On a vote being taken Mr. Steadman was appointed by a majority of 10 to 2. At first it was proposed to offer a fee of £10 for the work, but subsequently this was increased to £20, and the Clerk was directed to communicate with Mr. Steadman and ask him if he would accept the appointment. At the suggestion of Mr. Kelly, supported by Mr. M'Cafferty, it was agreed that in case Mr. Steadman did not accept, or his appointment was not sanctioned by the Local Government Board, that Mr. Swiney be appointed. The discussion referred to above took place some little time since, but we have not yet heard whether the gentleman selected has accepted the fee offered, which, to our mind, seems a strangely small one to offer a professional man of experience for a report on so involved and troublesome a matter as a water supply, and is one which might easily occupy many days in investigation. The principle of appointing a county surveyor on work of this kind is also a bad one.

**Enniskerry (Co. Wicklow).**—The Rathdown Rural District Council will shortly invite tenders for the drainage and sewage disposal works of Enniskerry. The system adopted will be bacteriological tanks and filters and irrigation overland. The engineers are Messrs. Ryan and Butler.

## QUARRY FOR SALE.

First-class Whole Limestone Quarry to be Let or Sold; best Building Stones in Ireland; or would be a first-rate chance for an enterprising company to start Cement Works, as there is an inexhaustible supply convenient to Canal and Railway. Apply to W. KEEGAN, Killenara, Portarlington.



### MARBLE FROM SLAG. A Noteworthy Invention.

The utilisation of the by-products of manufacturing processes has always been one of the chief aims of the practical scientist. Great triumphs have been achieved in this direction in the past; inventions are being constantly made by which materials hitherto regarded as useless waste are made to yield valuable substances, and there is no doubt that the future is destined to be even more prolific in discoveries of this nature. Amongst inventions of the kind to which we refer, the wonderful way in which coal tar has been utilised will probably occur to many, for of the products of this unsightly substance it may, in truth, be said that their name is legion.

Ever since the introduction of the blast furnace for the production of iron, the question of how to dispose of the resulting slag has become from year to year a more difficult one. Many attempts, mostly unsuccessful, have been made to convert it from being rubbish into something commercially valuable; but in spite of all, the fact remains that not only is the slag useless, but it costs a very considerable sum for its removal from the neighbourhood of iron works. It seems, however, that the problem has at last been surmounted. By a process patented by Mr. T. M. Thom, the manufacture from waste slag of material suitable for marble, granite, and other building stones is claimed as an established fact, and experts in the building trade in England have already declared enthusiastically in favour of the invention. In the opinion of the *Building News* Mr. Thom's process is destined "to create something in the nature of a revolution in the stone trades." The inventor, who is Managing Director of the Lithographic Stone and Marble Co., Ltd., 11-12 Finsbury Square, London, E.C., has such confidence in his process that he is on the point of entering into a contract with Sir B. Samuelson and Co., Ltd., Middlesbrough, to not only relieve them of their slag, but to pay for it at a certain sum per ton. Seeing that Messrs. Samuelson produce over 5,000 tons of slag each week, it is easy to appreciate the importance of the new industry.

Blast furnace slag is almost entirely a mixture of the silicates of alumina, lime, and magnesia, and therefore resembles generally the composition of many natural minerals such as those belonging to the Mica group. It also bears resemblance to the composition of Lapis Lazuli, and in some respects to Kaolin, and also to many silicates of the Serpentine group. It will thus be seen that there will be no difficulty in making an almost endless variety of stones by the use of blast furnace slag.

This important development has arisen from the experience gained in the production of marble and building stones used in masonry, whether they may be Compact, Magnesian, or Oolitic. For the latter patented process the waste *débris* of any good carbonate or magnesium limestone may be used. The necessary amount of stone is calcined in closed retorts for the purpose of liberating the gas and obtaining lime. The gas thus obtained is liquefied and stored in bottles for future use. The oxide is withdrawn and mixed in a revolving drum with a certain proportion of the ground carbonate, and when the lime and fine powder are thoroughly mixed, the whole is slaked. The hydrate of lime thus obtained is now in a fit state for pressing into slabs or other forms desired. Should, however, a coloured marble be desired, the colour, which is principally due to iron in its various combinations, is thoroughly mixed with the proportionate parts of the limestone and lime. The whole is then slaked. This method ensures absolute evenness of colour throughout the mass, whether it be red, Sienna, green, black, or other colour. The plastic material is now taken to a hydraulic press capable of exerting a pressure which will give a cubic measurement to the block equal to the best and closest-grained stone to be found in Nature. On removal from the press, the slabs are taken to a drying-room to expel the remaining moisture. The desiccated blocks are then placed in a cylinder, a vacuum is created, and the carbonic acid gas originally extracted from the limestone and stored is now brought into action. The gas is first fed into the tank at practically no pressure, but the assimilation of the gas by the lime is so rapid that heat is speedily generated. So long as heat is maintained, the tank requires feeding regularly only; but if signs of decrease are shown, then pressure must be gradually applied until such time as the gauge remains stationary. When this occurs the lime previously disseminated throughout the mass has become carbonate again, and the blocks are not to be distinguished from the natural stone.

Such, briefly, is the method of producing lithographic stones and marble. Portland, Bath, or any building stone used in masonry can be produced by the same method,

and are not to be distinguished from the quarry product, with which analysis proves them also to be practically identical in composition. Specific gravity tests show the artificial stones to be denser than the natural materials, while further experiments carried out by the well-known firm of Messrs. David Kircaldy and Son demonstrate that they offer tremendous resistance to thrusting stresses, and possess an exceedingly high crushing strain. Messrs. Kircaldy's report, for example, states that the crushing strain of the Reconstructed Bath Stone of this company was equal to 11,829 lbs. per square inch, while the following are the crushing strains in lbs. per square inch of the natural stones named:—Aberdeen Granite, 8,000; Statuary Marble, 6,066; Craigleath Sandstone, 5,490; Dundee Stone, 6,630; and Portland Oolite, 3,729. It is, therefore, evident that these artificial stones are likely to prove in all respects extremely valuable for building purposes, and they possess the following advantages over the natural stones:—(1) They can, in most cases, be moulded to the required design. (2) Where this is impossible, the masonry required is done at the intermediate stage, and at less than one-third the cost of dressing the natural stone. (3) They can, if needful, be produced from  $\frac{1}{2}$  inch to any desired thickness. The former renders the stones suitable for wall linings, a thing hitherto impossible. Those of our readers who would like to pursue this subject further are recommended to communicate with the Lithographic Stone and Marble Co., Ltd., 11 and 12 Finsbury Square, London, E.C.

We regret we fell into an error in stating that Mr. Tuitt was acting as engineer in connection with the scheme to provide Malahide with water. The engineer is Mr. R. A. Boyd, of Belfast, who was awarded a prize and the carriage of this scheme in competition with engineers from all parts of the United Kingdom. The work is now in hand.

### CONTRACT.

#### THE DUBLIN UNITED TRAMWAYS COMPANY (1896), LIMITED.

9 Upper Sackville Street, Dublin,  
27th October, 1906.

The Company is prepared to receive Tenders for the Supply of General Stores, including Car Fittings, Iron, Steel, Castings, Oils, Paints, Glass, Brushes, Ironmongery, Harness Materials, Electric Supplies, Timber, etc., for the year ending 31st December, 1907.

Forms of Tender (price two shillings each), conditions, and all information can be obtained and patterns seen, at the Secretary's Office, 9 Upper Sackville Street, from 20th October to 12th November, 1906.

Tenders, sealed, and marked on the outside, "Tenders for Stores," and addressed to the Chairman, to be lodged with me on or before 19th November, 1906.

(By Order), R. S. TRESILIAN,  
Secretary.

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Every Second Saturday.

[Estab. Jan. 1859.]

No. 23—Vol. XLVIII.

HEAD OFFICE

NOVEMBER 17, 1906.

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Price 1d.

## TOPICAL TOUCHES.

We direct the attention of any of our readers on the look-out for an up-to-date and wholesome gas stove to a description of "Clarke's Patent Hygienic Syphon Stoves," which appears elsewhere in our columns.

\* \* \* \* \*

In this issue we publish some particulars of the "Welsbach" incandescent light. The light itself is so well known as to need no description. But it may be of interest to note some particulars of what is now a very great industry, indeed.

\* \* \* \* \*

The "Welsbach" was invented twenty-two years ago by Baron Auer von Welsbach, and to-day this wonderful invention, which is produced through the admixture of a rare earth called Thorium with cerium, is used in all the lighthouses of the kingdom (and many foreign ones), producing a light which may be seen twenty-five miles away.

\* \* \* \* \*

The company's English works are at Wandsworth, where they make some 24 million mantles per annum. The mantles are made of fine Sea Island cotton, or of Ramie thread, and can be produced at the rate of twelve hundred mantles per day, and some six hundred girls are employed at this branch alone.

\* \* \* \* \*

Briefly, the process consists, first, of weaving, trimming, impregnating, fixing, stamping with the trade mark, then seasoning and toughening, and finally again trimming, testing, and packing.

\* \* \* \* \*

The company also make gas-cookers and radiators, as well as lamps up to 1,200 candle-power, in their splendidly-equipped works, which cover over five acres of ground, the arrangements made for the health and comfort of the workers being excellent.

\* \* \* \* \*

A serious accident occurred on Tuesday last at a shop now being built at Phibsboro' by Messrs. H. and J. Martin. The upper stage of the scaffolding was at the time being utilised to fix a small, projecting timber oriel window into position, when the brickwork upon which the putlogs rested gave way, precipitating brickwork, oriel, and staging, and, with the latter, four men who were at work thereon, on to the footpath beneath, a distance of over twenty feet. The ambulance was quickly on the spot, and the injured removed. All of the men were, of course, badly hurt, three of them dangerously, but, according to recent reports, are doing well.

\* \* \* \* \*

The unfortunate mishap was, of course, purely accidental, and, so far as we know, no blame attaches to anyone; but the incident goes to remind those responsible for such works that it is impossible to be too careful in erecting scaffolding. It is remarkable, and a proof of the care exercised, that so few such accidents occur in Dublin. The men employed as scaffolders in the building trade in Dublin are, as a rule, very experienced and careful hands. The building at which the accident occurred is Mr. Doyle's public-house.

It has been decided to adopt the "Shone Ejector" system for raising the Blackrock sewage to a higher level.

\* \* \* \* \*

In the sensational matrimonial case between the Count and Countess de Castellone, tried in Paris the other day, it was mentioned, in passing, that the Countess, a daughter of the late Jay Gould, had paid £2,800 to M. Carolus Duran for painting her portrait.

\* \* \* \* \*

Professor Hubert Herkomer has lately been delivering the "Hermione" lectures, choosing as his subject "Painting." These lectures were established as a memorial to the late Duchess of Leinster, and consist of a course given annually by some artist of eminence at the Alexandra College.

\* \* \* \* \*

The regulations of the Local Government Board respecting the working of the new Labourers' Act have at length been formulated, and are a great disappointment to architects, who had expected to find the L.G.B. standing up for fair remuneration for competent professional men; but so far from this being the case, they have actually named a maximum fee, far below the figure named by many of the most enlightened and experienced councils in Ireland. They have named a maximum fee of 2½ per cent. to cover all work except marking sites, no fees being allowed on cottages not built, no car hire or travelling expenses! As against this, the South Dublin Council, knowing, through long experience, this to be about the most responsible and troublesome class of building work in Ireland, named a fee of 5 per cent., in addition to other substantial emoluments. In Rathdown district 3½ per cent. was named, with 10s. 6d. "marking fee," and 25s. per cottage fee on cottages not proceeded with, and this Council, be it borne in mind, paid also special fees for attending inquiries, arbitrations, land valuations, special visits, lease maps, etc., etc. The Omagh Council named somewhat similar terms, as, we believe, did most of the districts which had real experience of the Acts.

\* \* \* \* \*

The L.G.B. made a capital beginning in their interpretation, as far as it went, of the Government's intentions in regard to the qualification of architects, but has now absolutely nullified their previous act, for of what use is it demanding a higher qualification if a fair, reasonable fee is denied these qualified men? This action of the L.G.B. has, we feel certain, not been taken under the advice of any of their professional advisers, who know too much of the facts to recommend such false economy. The labour has been increased three-fold. No less than forty odd new forms, striped more variously than Joseph's coat, and firmly bound with roll upon roll of red tape, have been introduced, to the mystification of clerks and architects alike. The lawyer almost disappears, but what is saved on his fees will be more than swallowed up by the printer. The absurd cutting down of fees will inevitably lead to abuses, and we feel certain there will be a big reaction against the needlessly complicated and troublesome procedure, which, so far from being economised, has been rendered more costly in many respects.



## TOULOUSE AND THE MIDI.

## A SUMMER HOLIDAY.

By D. W. MORRIS, Surveyor.

The night "Rapide" from the Quai D'Orsay took us with speed and comfort to Toulouse, the ancient capital of Languedoc. It is a wealthy town, of 150,000 inhabitants, finely situated on the Garonne, with a long and interesting history, and populated, as you may fairly say all France's, by an industrious, intelligent, and artistic people. In our wanderings through it we never met a policeman, and we reverently thought of Dublin, where they swarm. What is strangest in this is, Dublin has practically no criminal population, whereas, in France, this element is a difficult one to deal with; and, although not very serious outside Paris, yet requires considerable attention in cities like Toulouse. The industry of the French people is amazing, their thrift, comfort, mode of life, sobriety, are examples to be followed. There is no disorder or loafing, nothing but calm, diligent attention by each one to his own affairs. Toulouse is surrounded by gardens, where early fruits and vegetables are grown in abundance. It is also celebrated for its geese, its *pâté de foie gras*, its truffles, wines, and many other table delicacies which go to make life pleasant in this pleasant land of France. Would that the Irish farmer could get out of his land, not less fertile than the French, something like, or near, what is produced here; he may not produce wine, but, if his soil were worked as the French work theirs, it is hard to say what it would not give up. The French Revolution did a great day's work, and, although, like great upheavals, it hurt some, the evil it did is lost deep in the good it brought to France.

## Toulouse.

Toulouse is the See of an Archbishop, and the seat of a University; and, to the architect, is a place of surpassing interest. In the months of July and August it is too hot for anyone from our latitude. The months of September and October are ideal months for visiting and studying the beautiful Romanesque and Renaissance work in and around it. Perhaps, it may be said, that modern changes have touched Toulouse least of all French cities; and, perhaps, as much as Rouen, or even more, it is worthy of the attention of the architect. It is the centre of French Romanesque, and, in the Basilica of St. Sernin it has one of the finest Romanesque buildings in the world. It possesses also most beautiful examples of the Renaissance; and in a week's stay, architectural works of the highest interest can be found at every corner. Through the country around, in the towns and villages, are numerous Romanesque churches, all based on the great church of St. Sernin. It is a style that would be admirably suited to Ireland. The ornament is simple, and the forms would in every way suit our materials. The interiors are plain and massive, and both inside and outside the effect depends on composition and grouping rather than on ornament.

In Toulouse bricks have been used from the earliest times, and are still almost universally employed. St. Sernin, with its magnificent tower, is built of brick. The bricks are exactly the same now as in the days of St. Sernin. They are about two inches thick and  $8\frac{1}{2}$  inches long, of nice red colour. They are set with half-inch joints, and unless where absolutely necessary have no headers. The effect is beautiful, and the brickwork of St. Sernin would prove to anyone that good bricks are not unfit material for a great Basilica.

## Church of St. Sernin.

The Church of St. Saturnin, or Sernin, is a minor Basilica, in virtue of a Bull of Pope Urban VIII., and was begun about 1080. The Choir was consecrated by Pope Urban II. in 1096, and Pope Calixtus II. came to consecrate an altar in it in 1119. The works were carried on fairly well till about 1130, when it would appear some difficulties arose, and attention was given to the erection of a sumptuous cloister, and other enterprises, which caused St. Sernin to lag. Then, the crusade against the Albigenses did not tend to help matters. However, the great work was not entirely stopped, and in the middle of the thirteenth century the

present great central tower was undertaken. For this purpose, the four pillars at the intersection of the nave and transepts were enlarged, spoiling, in some respects, the interior perspective. Afterwards attention was turned to the west front, where it was intended to erect two towers. They were, however, never done, and the church is now, practically, as it was left in 1271, when the county of Toulouse was united to the French crown. A general restoration was undertaken by the late Viollet-le-Duc, and continued till 1890, since when, hardly anything has been done.

This noble church is cruciform, and has a nave with double aisles. It is 330 feet long, and 104 feet wide. The transepts measure 210 feet across, and the nave is 70 feet high. There are nine semi-circular chapels off the apse and transepts; and they, with the apse, choir, transepts, and great central tower, form a magnificent eastern end. The tower is octagonal on plan, five storeys high, with a balustrade and spire 210 feet above the ground; all of brick with cut-stone dressings, beautiful in design, and most delightful to see.

Before going into the church, it ought to be approached from the east, where a fine view can be had of it, and it can be seen how great it is.

The interior is somewhat gloomy, as the windows of the clerestory open into the triforia over the aisles, and the nave is trusting to these arcades for light. Still the effect is very fine. The pillars are of the simplest character, and the arcades of the triforia, especially in the transepts, are most interesting. Altogether it is the work of a great architect, and in its details and plan betrays great culture and invention.

St. Sernin is, in other respects, a veritable mine of interest. It is a great place of pilgrimage, and contains portions of the True Cross, the Crown of Thorns, relics of six Apostles, of St. Sernin, the first Bishop of Toulouse, of many of his successors, of St. Thomas Aquinas, St. Dominick, St. Remy, and a multitude of noteworthy and sacred souvenirs of the mighty dead.

The stalls in the choir are Renaissance, of fine design and workmanship. On one of them, is to be found carved a pig in a pulpit, with the inscription: "Calvin le porc pt." Behind the altar is the tomb of St. Sernin.

The crypt is worth a visit. It contains the memorials above referred to; and the whole is explained by a priest of the church. When we visited it, we were shown round by a nice old priest who, when he was told we were Irish, exclaimed: "Ah! le beau et le bon pays," and immediately invited us to sign our names in the visitors' book. Any Irishman visiting St. Sernin may count on a kind reception. Indeed, being an Irishman is a passport in France to the best offices of its generous and worthy people.

## The Cathedral.

We come next to the Cathedral of St. Stephen. It unfortunately, is not Romanesque, and perhaps, is not of great interest, except for the incoherence of its plan. The front, flanked by a huge tower, dates from the 15th century. It has taken the place of an earlier front, the rose window of which is retained; but the position of the latter is no longer central with regard to the main door. The nave dates in part from the end of the 11th century. It is wide and low, without aisles, and was evidently intended to be rebuilt after the choir, which was started in 1272 in the style of a great Northern Cathedral, and with a different axis. In 1445 the Archbishop, Peter of the Mill, seems to have determined to leave matters as they were, as he constructed a fine western door, and, under Louis XII., Cardinal D'Orleans Longueville, by a system of vaulting and a huge pillar, established some harmony between the two parts of the church. Part of the nave is the early Romanesque Cathedral built by the Bishop Isarn. In the end of the 12th century, or thereabouts, the pillars forming the aisles were removed, and the whole was

vaulted over—the most venturesome piece of vaulting yet done in the South. The great rose window dates from about 1230, as well as the principal window of the north side wall. It would seem as if it were never intended to build transepts.

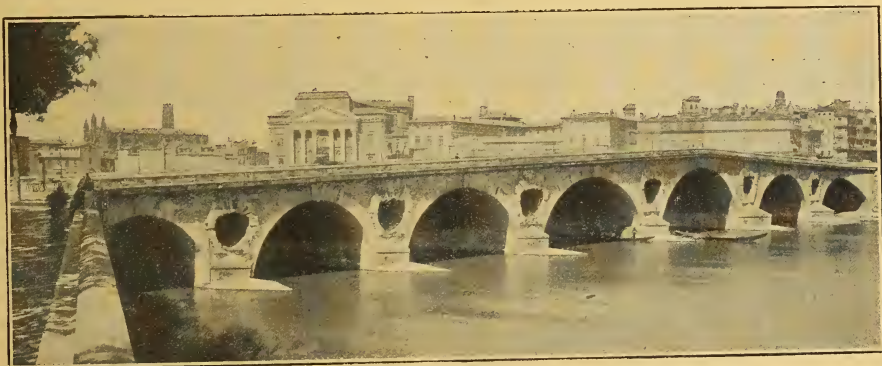
The similarity between the choir here and the Cathedral of Narbonne, which was commenced the same year, leaves hardly any doubt that they were both by the same architect. The height of the choir vault is much less than the proportion usually given, and it has a somewhat depressing effect. There is some stained glass of the 15th and 17th centuries, and the metal screens and the stalls are worthy of notice.

#### Church of the Jacobins.

Continuing to deal with religious buildings, the next of importance is the Church of the Convent of the Jacobins, with its most graceful tower, both now forming part of the Lycée. This convent was the principal one of the Dominicans, and was founded by St. Dominick himself, but on another site. It is called Jacobins, because the Paris House was situated in St. James's Street. The actual buildings were commenced about 1230 with the church, which was consecrated in 1292; the tower dates from 1294. Notwithstanding the mutilations it has undergone, and the strange purposes to which it has been put, being stable, market, rubbish heap, etc., many times, it is a delightful building. The tower, which has no spire, is a perfect Toulousan tower of most charming design in brick and cut stone like St.

Romanesque period, this church dates mainly in its present condition from the XIV. century. In the niches at the sides of the entrance are two statues, said to be as old as 1348, and to have been done to the order of Jean de la Tisserenderie, Bishop of Rieux, who had several more carved, many of which can be seen in the museum, and which the Guide Joanne says, "mark a new flight of Toulousan art of the middle ages, and shew on the part of their authors a certainty of knowledge, an acquaintance with the melancholy sentiments of the human soul, and a delicacy of taste which provoke admiration." The tower here is of a type that may be often found, either complete or simplified, in many of the localities around. The plan of the choir inside may be remarked, the two small side apses are additions of the XV. century. A very ancient vault was discovered in 1885 under the high altar. The paintings of the choir (the martyrdom of St. Sernin) are by a contemporary artist.

Near the Pont Neuf, which, strange to say, is as old as 1626, and of remarkable construction, is the Church of Notre Dame la Daurade. It was at first called Notre Dame la Fabriquée, and, in the XI. century, was affiliated to Cluny, and in the XVII. to the congregation of St. Maur. This celebrated sanctuary, whose Madonna is still the object of a pilgrimage, was made a minor Basilica in the XVII. century. The actual church was built in 1790 by the architect, Hardy, on the site of a Gallo-Roman building decorated with mosaics, with a golden background, the latter giving to the church its name, La Daurade. There



Le Pont Neuf, with the Church of the Jacobins in the distance, on the left.

Sernin's. The church has two naves, with a centre line of pillars, and was the model of the chapels of the Order (Paris, Agen, etc.), for two centuries. Owing to the ground being raised about 5 feet, it has lost some of its altitude; the windows have also been built up, and the cut-stone removed in many places. The pillar next the apse carries a series of ribs which join the apse wall. The vaulting here is a marvel; indeed, it is wonderful how it stops there. Part also of the cloister exists, dating from 1307, with marble columns, and interesting capitals. The refectory, chapter house, and a small chapel also remain. The latter was constructed and decorated towards 1340 by the Bishop of Pamiers, and the Canons of that city have the right of burial in it. These buildings, although of simple design, are most charming. It may be seen from them how simple beautiful architecture may be. In the small chapel are some XIV. century frescoes. From the elevated portions of the city the whole of these buildings, at least the church and tower, can be well seen, and they look very striking. It is a pity they have suffered so much. We can hardly hope for restoration now, as they appear to have given up that mode of spending money in France.

Our next visit was to the Church of Our Lady of the Bull. The Bull was the instrument of the martyrdom of St. Saturninus, and in its mad course with the saint tied to it, stopped here. Reconstructed in the VI. century by the Franc duke Launebode, and again, without doubt, in the

are still some remains of the ancient church, and its mosaics, as well as some of its columns. It is much to be regretted that more has not been preserved.

Some distance off there is another Church of Our Lady, La Dalbade. It owes its name to the fact that the first building (IX. or X. century) had its brick walls whitened with chalk. It was built in 1542 in the Gothic style, on the site of a church which had not been in existence a hundred years. It is flanked on the left, between nave and choir, by an imposing square tower, with an octagonal spire, demolished in 1792, but, happily, reconstructed in 1882 by the efforts of the parish priest. The height of the tower is about 260 feet. The entrance, designed by Michael Colin in 1537, is most charming Renaissance work. Unfortunately, a coloured terra-cotta tympanum has been latterly set in it, which it would be well to remove, and replace with one in keeping with the portal itself. Inside may be remarked the boldness of the wide, single nave, and in the chapels some pictures and sculptures of considerable interest. One of the bells is dated 1728.

There are several other churches; one of them, begun in 1847, is famous in the Midi by the slowness of its execution. The church of the Jesuits and that of the Dominicans are, the first principally, fine buildings by the architect, Bach, in the purest style of the XIII. century. Near the Palace of Justice is the Chapel of the Inquisition, which stands on the site of the first house of the Dominicans, but it has



preserved nothing of the XIII. century. In the nave of this chapel, which now belongs to an Order of Reparation, may be seen the splendid costumes of the nuns, who devote themselves to the perpetual adoration of the Most Holy Sacrament. There is another church, St. Peter of the Bakeries, which owes its curious name to the fact that the inhabitants of the parish baked their bread in the monks' ovens—a genial characteristic of the Middle Ages, that our enlightened civilisation might condescend to regret.

Toulouse, as may be seen, has many beautiful churches; and it is no less celebrated for some of its civil buildings, which are of the highest type of graceful Renaissance. Beginning with the Town Hall, called "The Capitol," it is in the Ionic style, and was built about 1750. This pretentious name has not the origin it conveys. It is so called after "The Capitouls," who were the local magistrates before the Revolution. In the centre of the rear facade is the Donjon of the Archives (1525), to which Viollet-le-Duc put some additions. In the large rooms for ceremonies and fetes the decorations, paintings, and sculpture are the work of Toulousan artists; and they celebrate Toulousan feats in peace and war. The Palace of Justice, at the south end of the town, is on the site of an ancient castle, the residence of the Visigoth Kings, of the Kings, or Dukes, of Aquitaine, of the Counts of Toulouse, and the seat of a Parliament. The last remains of this castle disappeared only after the Revolution. The oldest part of the palace dates from Louis XIII. The more one knows of France, the more one wonders at what it has lost, and regrets the destroying hand, not, indeed, of time, but of reckless man in his madness. Some fine ceilings are to be found in the palace from the Sun King's time.

#### The Renaissance Work of Toulouse.

Adjoining the Lycée before referred to, is the Hotel Bernuy. This was the house of John de Bernuy, a merchant of Toledo, who established himself in Toulouse, and there enriched himself. The street front and other portions were commenced in 1504, and are Gothic; but in 1533, another architect began the elevations of the main court, and here we have a true work of art of the French Renaissance. What now exists is only the greater part of the hotel, which was acquired by the Jesuits in 1566, and was mutilated in the XVII. century; but an intelligent restoration of these precious remains has been carried out in our time by the architect, De Bandot, and it has left them, we hope, safe for years to come. It is impossible to describe the beauty of this building. No style for an hotel of this character could be better chosen. In the vicinity of the Pont Neuf is another Renaissance gem—the Hotel d'Assézat. This dates from 1555, and was executed by J. Castagne, master mason, called Nicot, according to the written and ordered articles of Master Nicholas Bachelier. So, Toulouse had an architect in the XVI. century of the same name as Dublin in the XX. In this building the Toulousan artists do not recognise the usual manner of Bachelier, except in the external door. Peter d'Assézat, for whom the work was being done, having had the bad taste to become a Calvinist—and the powers of his time having had the injustice to banish him, and deprive him of his goods—was not able, on his return to Catholicism, to recover enough of his worldly wealth to complete it himself; therefore, the upper storey and the finish of the stairs turret belong to the end of the XVI. century. The court, with its arched vestibule, and the storeys with the coupled pillars, are the most remarkable portions of this remarkable building. The last owner, with a splendid and truly French generosity, left this hotel to the learned societies of Toulouse. Many interesting things are now housed therein, including a library of 50,000 volumes.

Near the Church de la Dalbade is the "Stone House," so-called because its fine front is entirely built of cut stone—a rare thing formerly in Toulouse. There is a wealth of carving here of marvellously fine workmanship; in fact, one might think it is overdone; and, although the front is imposing, the composition is in parts held to be in doubtful taste. The court dates from 1550, and the front from 1612, the latter being restored in 1857.

The Hotel of the Old Grape, known also under several

other names, dates from the middle of the XVI. century, and is notable for being begun and finished by lawyers. The sculpture of the windows of the court, a chimney piece inside, and a Latin inscription on the stairs doorway are of interest.

There are also numerous minor buildings and bits of Renaissance and other styles in the bye-streets, a detailed account of which may be found in the admirable Guide *Joanne* of Toulouse, published by Hachette and Co., Paris and London. To any visitor here, or, indeed, anywhere in France, we strongly recommend these Guides *Joanne*. They are invaluable to the architect, as they give a very detailed, critical, and artistic description of the many interesting buildings to be found in French towns and country.

There are also in Toulouse many good buildings of the XVII. and XVIII. centuries, which can easily be found if one is so inclined. In the XVIII. century two great iron-workers flourished here, and beautiful examples of their work, balconies, handrails, etc., of remarkable design and workmanship may be found in many places.

In the College of Foix, now attached to the Convent of the Sisters of Compassion, and founded in 1457 by the Cardinal de Foix, Archbishop of Arles, we have a building free from all restorations, with its towers, arcades, windows, and parapets in their original condition.

Toulouse, unlike most French cities, possesses few statues, or memorials to public men. It has only five, one of them, an obelisk, to the memory of the French soldiers who fell in the battle of Toulouse, 1814, when the English army, 60,000 strong, under Wellington, drove back, at great loss to themselves, Marshal Soult's force of 30,000.

The Museum, comprising a part of the ancient convent of the Augustinians, and a modern brick and stone building by Viollet-le-Duc, is one of the richest outside Paris. The work of Viollet-le-Duc is not very striking, but he had the good sense to follow local custom, and use brick. The old Church of the Convent is much less interesting than the Cloisters, the Sacristy, Our Lady's Chapel of Pity, and the Chapter Room. These latter being now united; they form a fine enclosure, with a centre of slender octagon columns. There are valuable works of sculpture, painting, etc., housed here; many of them of ancient date, and many having some connection with the life and history of the city. The Toulousan school is, of course, strongly represented by Despax, Laurens and others.

There is not in France, Paris excepted, a city which can boast of so many learned societies, all flourishing, and many of long ago; one of them dates from 1323, when seven Toulousan troubadours gathered in a suburb to uphold in Languedoc the "gaie science," and formed themselves under the title of the "Collège du gai Savoir" into a literary society, which held next year a tournament of song amongst the poets of the Sunny South, and decreed the golden violet to Master Armand Vidal, of Castelnaudary. This society was manfully supported by the city magistrates. Voltaire was a laureat, so was Fabre d'Eglantine. The latter owes his name to the Eglantine won here by him.

In connection with the commerce of Toulouse, we must mention the Canal du Midi, which connects the Garonne with the Mediterranean. This great engineering work was done in 1666 by Paul Riquet, of Beziers, entirely at his own expense, at a cost of what would represent to-day a sum of £1,360,000. His statue stands in Toulouse, its tribute to a great engineer. There is still a fact worth mentioning in connection with the Canal du Midi and the Canal Latéral; their control was given by the State to the Railway Company of the Midi, and, as the latter favoured the railway at the expense of the canals, their traffic was diminishing; whereupon, the State withdrew the concession, and the boat traffic has since marvellously increased, and is now flourishing.

Toulouse has been for many centuries a place of great importance. When the Romans arrived, it was the second town of the Volci. Conquered by the Cæsars in 120 B.C., it quickly took to the invaders, and enjoyed special privileges from them—privileges which, indeed, were continued to it by the various rulers till Louis XIV. In the time of Cæsar Augustus Toulouse was one of the intellectual centres of Gaul. Saint Saturninus preached the

Gospel here, and was martyred by the Pagan Priests, as we have before mentioned. It was made by the Visigoth Kings the chief town of their kingdom; and, in spite of attacks by the Moors, and others, it retained its pre-eminence as capital of the South. In 1150, Henry Plantagenet, Duke of Aquitaine and King of England, besieged it; but the Count Raymond V., loyally calling in the aid of Louis VII., King of France, repelled the aggressor. In 1271 it became an integral part of the French Kingdom, and was given a Parliament, which it retained till the Revolution. The Albigenes, and the religious quarrels of the XVI. century, caused some troubles; but, on the whole, its position was less touched by these incidents than might be expected, and it remains to-day a cultured, wealthy city, admirably situated on the highway between two oceans, in the centre of a rich and smiling country.

From the XI. century it has been one of the French cities where artistic life has been most intense. A great school of art was founded here about this time. It was based on Romanesque traditions, which, enlivened by local genius, produced beautiful things, much being now lost, but, happily, much remains. The Northern Gothic came, indeed, to trouble local art; but Toulousan spirit was strong enough to resist, and invent a Southern Gothic, suited to the employment of brick, stone being scarce and dear in the vicinity of the Garonne. This accounts for the absence of aisles in the churches, pillars of bricks being necessarily too large, and pillars of stone too costly. The Renaissance shone here with brilliancy. It would appear it came from the North, rather than from Italy; and here again Toulousan genius asserted itself, for in the works of Michael Colín and Nicholas Bachelier we have an art that you do not find elsewhere. Even in our days, sculpture and music flourish in Toulouse; and every fortnight a review "L'Art Meridional," is published, of great merit and large circulation.

To finish with this interesting city, the hotels are excellent. Where we stopped, the Grand Hotel Tivollier, is very new, and one of the best. Toulouse is famous for its food and cooking; and if you are there when the Chasselas grapes can be had for twopence a pound, you cannot do better than buy some, and sit on a bench by the Garonne, or in one of the public gardens, and enjoy the sunny flavour of this fine fruit.

Our course now takes us along the Pyrenees to the Bay of Biscay; and we regret time and other circumstances hindered us from visiting lovely Carcassonne, Narbonne, and the Mediterranean. We hope, however, to see them again, and to say something of their architecture, art, and history to the readers of the IRISH BUILDER.

(To be continued.)

## CORRESPONDENCE.

### Dustless Roads.

TO THE EDITOR OF THE IRISH BUILDER.

Sir,—With reference to the paragraph in your issue of 5/11/06 re my letter in the *Surveyor*, I beg to inform you the proportion of lime and granite or chips is half a barrel of lime to a load of gravel or chips, not two barrels of lime to a load of gravel, as quoted by you. Doubtless this is a printer's error of the *Surveyor*'s or yours.

You are under a misapprehension in predicting that the mixture would soften with a hot sun. This is not so, and herein lies one of its most valuable properties.

It may interest your readers to know that I have, since my letter appeared in the *Surveyor*, heard from the Beddington Town Surveyor (Newcastle-on-Tyne) that he laid down a road twelve months ago in the way I describe, and with the very best results, and his council are about to use the method extensively.

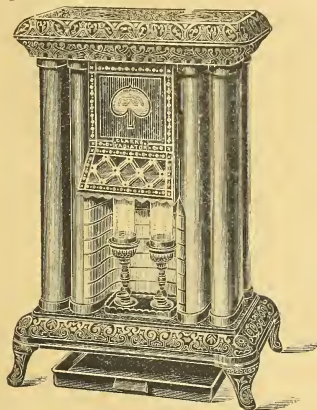
Experience will, no doubt, be necessary for the purpose of determining the best proportions, but I claim for the idea that it does away entirely with many of the objections to tar by itself, and accordingly advances the solution of the question.—Yours truly,

E. A. HACKETT, Co. Surveyor.

County Surveyor's Office, Clonmel, Co. Tipperary,  
6th November, 1906.

## REVIEWS OF CATALOGUES.

**Clark's Patent Hygienic "Syphon" Stoves.**—This is an interesting catalogue dealing with one of the most recent methods of utilising coal gas for heating purposes. The subject is an attractive one, inasmuch as it focuses attention on the struggle between the open coal fire and the more modern methods of internal heating. There is no doubt that the open fire, when burning in a room, has a cheering and homely effect, which will always endear it to many; but at the same time there is no denying the fact that a more wasteful method of heating a room could hardly be devised. It is hardly an exaggeration to state that, in the majority of open fire-grates used, three-fourths of the heat produced



passes directly up the chimney. Nor is this the least objection to the coal fire. The difficulty in keeping a room at anything like an even temperature is practically insurmountable, and the wastefulness in constantly stoking up and keeping the fuel alight when it is not absolutely needed, is no small matter of unnecessary expense. These may be called the internal disadvantages of the coal fire; externally they manifest themselves in the form of the smoke nuisance, which is one of the, as yet, unsolved problems of modern city life. It is, therefore, not to be wondered at that in recent years persistent efforts are being made to secure internal heating in some other way than by the direct burning of coal, and, naturally enough, it is to coal-gas—the essence of coal—that most experimenters have turned their attention. Stoves for utilising coal-gas as fuel have also, however, their disadvantages. Broadly speaking, they are constructed either with or without a flue to carry off the products of combustion. In the former case, a large percentage of heat passes up the flue and is not utilised, whilst in the latter the air of the room is rapidly vitiated. The ideal stove is clearly one that generates pure heat only, and wastes none of it. Clark's Patent "Hygienic Syphon Stove" is constructed on this principle. The heat produced is pure, equable, and agreeable, and no fumes or smell are given off. The stoves, consequently, require no flue-pipe, and the whole heat generated is retained in the apartment. We illustrate herewith one of the new models of these stoves, the appearance of which speaks for itself, and which is capable of heating a space 20 ft. by 20 ft. on a consumption of 15 cubic feet of gas per hour when full on. The principle of the "Syphon" Stove is fully explained in the catalogue, which is obtainable from the manufacturers, Messrs. S. Clark and Co., Compton Works, Canonbury Road, Highbury, London, N.

**Sichel (Size) Glue.**—This glue has been specially introduced as a size for painters and decorators, and several advantages are claimed for it over the ordinary animal glues and sizes. Amongst these are the following, which will readily commend themselves to everyone accustomed to distemper work: It dissolves in cold water, is non-odorous, and will not decompose, ferment, get mouldy, or deteriorate in hot or cold weather. It has also great

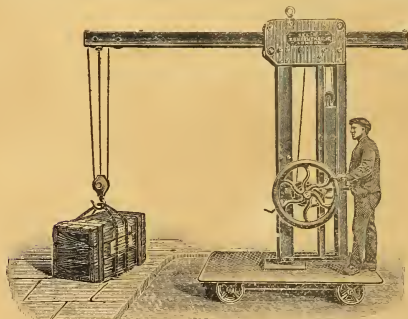


covering power, works easily, dries quickly, and is extremely and uniformly tenacious. "Sichel-Glue" has been very highly recommended by technical experts, having received flattering notices from the "Decorators and Painters' Magazine" and other trade journals. It is said to be especially valuable for application to damp walls and fresh plaster or cement work. Full particulars, samples, &c., can be obtained from Messrs. Brooks, Thomas & Co., Ltd., 4 Sackville Place, Dublin; or Messrs. Rd. Corr and Co., 26, 28 Corporation Street, Belfast.

#### Carron Cooking Apparatus, for gas, steam, and coal:

This imposing catalogue is quite in keeping with the other publications of the celebrated Stirlingshire firm, being superbly produced and copiously illustrated. The number and variety of cooking apparatus shown in it are bewildering, and include practically every form of cooking range and appliance in general use. The book is divided into two sections—Coal and steam, and gas respectively, and the company indicate that, in addition to the articles included, they are prepared to specify and quote for any size, style, or combination of cooking apparatus, and to offer suggestions and submit drawings and schemes, free of charge. They have laid down installations in several of the best known hotels and institutions in the country, and, without exception, all are giving satisfaction. It may be mentioned that a staff of competent workmen is kept, and the company recommend that, wherever possible, all their special goods should be erected by their own men. The Dublin depot and showrooms of the Carron Company are at 44 Grafton street.

Messrs. Selig, Sonnenthal and Co., Engineers, 85 Queen Victoria Street, and Lambeth Hill, London, E.C., send us particulars of their portable cranes, which appear to us to embody several useful and novel features. The patent portable hand crane, with automatic extending and reeling jib, an illustration of which we give, is a particularly handy machine. It can be had in three sizes, to lift from 5 to 10 cwt., and is of special advantage in warehouses where headroom is limited, and where it is necessary to lay down goods at different positions from the centre of the crane; also for loading and unloading vans, railway trucks, and, in fact, for a great variety of purposes. The jib is fitted with a counter-balance weight, so that the operation is performed with a minimum of power. The whole crane revolves round a pivot, and this, combined with the fact that the jib can be run in and out, enables



the load to be lifted from and deposited on a large area without moving the crane itself. An automatic friction brake is also fitted, which instantly seizes the load and holds it immediately the driving handles are let go. This brake is further designed that it can be used for lowering, so that the load can be let down at any desired speed in perfect safety.

Holafel's "Pintoff" Paint and Varnish Remover: Holafel's Compositions Co., Ltd., Milburn House, Newcastle-on-Tyne. The makers of this paint remover are well-known in the shipping world as manufacturers of anti-corrosive and anti-fouling compositions for ships' bottoms. The extent to which their trade in these compositions has grown, is extraordinary, and at present reaches figures which would probably astound firms whose trade is confined to the making of decorative paint. All the navies of the world, and the principal shipping firms use them, and in 1904, 4,709 vessels, aggregating a tonnage of nearly

11,000,000 tons, were coated. "Pintoff" is one of the quickest and most effective paint-removers ever introduced. In appearance it resembles flour paste, and is applied with an ordinary paint brush. From five minutes upwards, after application (according to the amount of the paint to be removed), it will be found an easy matter to remove the coating with a putty-knife or brush. It is claimed for "Pintoff" that it does not stain, darken, ruin the grain, or in any way injure the most delicate wood, and that it is innocuous to hands or brushes. Samples, prices, and full particulars can be had from the firm on application to the head office in Newcastle-on-Tyne.

#### REVIEWS.

"A Guide to Electric Lighting," by S. R. Bottone.—This handy little volume, the sixth edition of which has just left the press, has been a very successful publication, having reached its thirty-fifth thousand. Mr. Bottone, the author, is well known as a writer on electricity, as he has before now been responsible for a number of practical treatises on different branches of the subject. His aim, in the book under consideration, is to afford in a succinct and concise manner, an insight into the general principles governing the production of light by electricity, and into the appliances indispensable to attain that result. The theoretical or mathematical aspects of the question are not enlarged upon, but it is assumed that the reader approaches the subject without previous knowledge, and hence everything is explained sufficiently to enable him to form an intelligent idea of the results indicated. In a word, the author's treatment is at once simple, lucid, and eminently practical, and the illustrations are numerous and instructive. The present edition has been brought thoroughly up-to-date, the book being, in fact, entirely re-written. It is what it claims to be, an accurate treatise, in simple language, on the generation and utilisation of electricity for the production of light, and the transmission of power. "A Guide to Electric Lighting" is published at one shilling, by Messrs. Whittaker and Co., 2 White Hart Street, Paternoster Square, London.

#### IMPORTS.

##### PORT OF DUBLIN.

November 1st, per Winga, from Göteborg, 6,100 bundles laths, 34,906 pieces, 781 bundles planed boards, 310 pieces doors, 5 cases glass, to order; per Velinhete, from Port Dinorwic, 100 tons slates, W. and L. Crowe, Ltd.

November 2nd, per Freysdal, from Mirasnichi, 28,377 pieces deals, scantlings and ends, T. and C. Martin, Ltd.; per City of Brussels, from Ghent, 12,165 bags cement, 11 cases marble, to order; per City of Stockholm, from Rotterdam, 80 bundles slates, to order; per City of Belfast, from Antwerp, 9 bags cement, 489 joists, 17 cases marble, 3 cases plate glass, to order; 33 cases window glass, A. Bassi; 140 cases window glass, Brooks, Thomas & Co., Ltd.; 6 cases window glass, T. Brannigan; 100 cases window glass, Hoyte and Son; 40 cases window glass, J. Arigho; per Clifton Grove, from Shoreham, 280 tons cement, W. Richardson; per Result, from Chester, 180 tons bricks, T. and C. Martin, Ltd.; per Catherine Latham, from Chester, 125 tons bricks, T. Archer.

November 5th, per Franziska, from Salsic, 30,238 pieces deals, 1,730 pieces deals and ends, Brooks, Thomas & Co., Ltd.; per Eldrid, from London, 400 tons cement, W. and L. Crowe, Ltd.; per Bangor, from Rochester, 345 tons cement, T. and C. Martin, Ltd.; per Holywath, from Chester, 130 tons bricks, H. and J. Martin, Ltd.; per Maggie Barratt, from Chester, 180 tons bricks, McNaughton and Co.

November 6th, per Norma, from Sundswall, 6,183 pieces buttens and scantlings, W. and L. Crowe, Ltd.; per Elizabeth, from Camarvon, 112 tons slates, T. Archer; 2,700 sacks cement, T. Dockrell, Son and Co., Ltd.; 30 packages lead, do., do.

November 8th, per Lord Lansdowne, from Baltimore, 279 pieces, 562 bundles pine lumber, 250 tons roofing slates, to order; per Lady Hudson-Kinahan, from London, 1,100 sacks cement, T. Dockrell, Son and Co., Ltd.; 1,000 sacks cement, J. Kelly and Son.

November 9th, per Carrigan Head, from Port Inghis and Galveston, 26 pitch pine logs, 4,599 pieces pitch pine lumber.

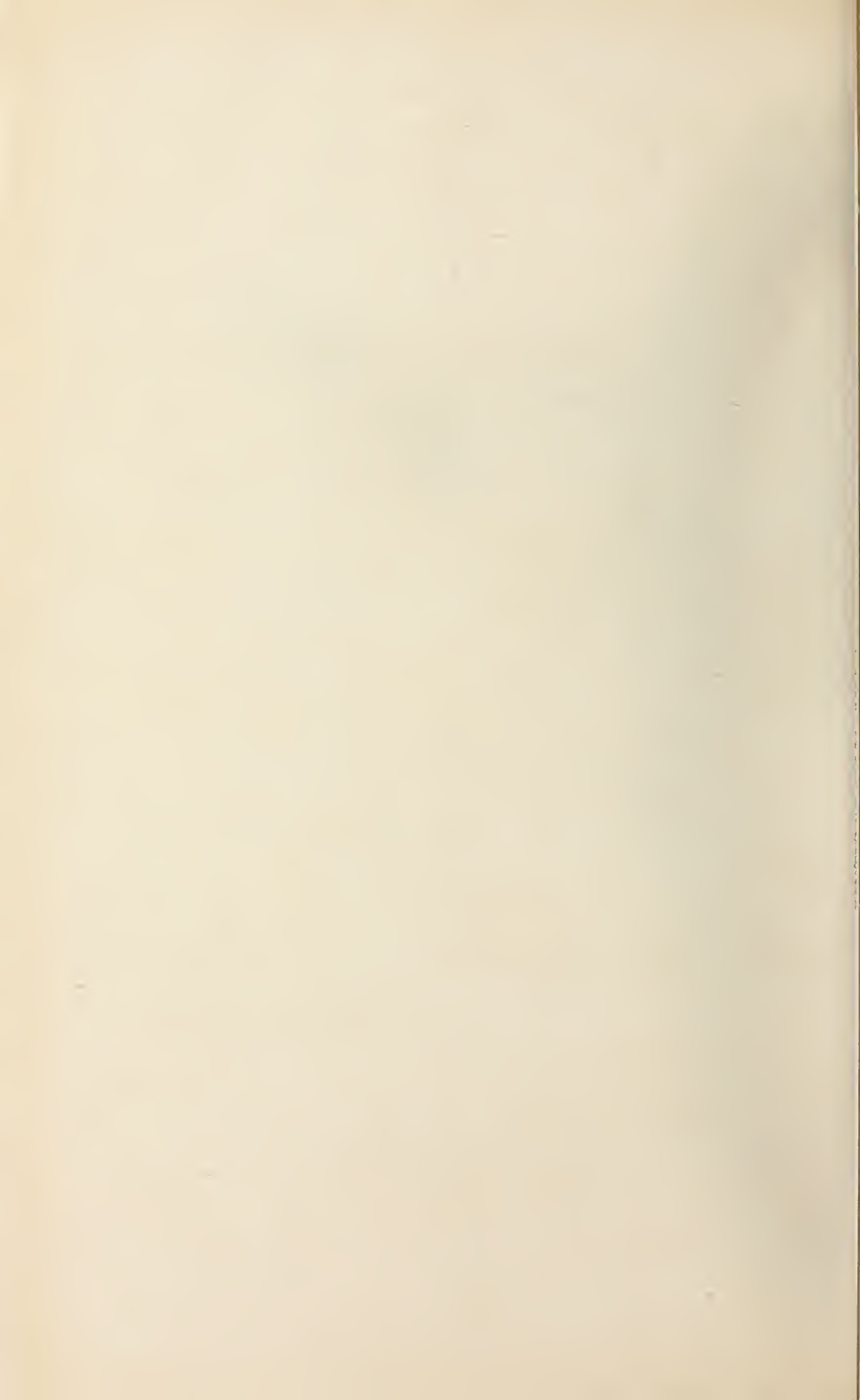
November 12, per Valde Travers, from Treport, 100 bags plaster, to order; per City of Oporto, from Hamburg, 1,892 casks asphalt, to order; per Lady Olive, from London, 600 sacks cement, T. Dockrell, Son and Co., Ltd.

November 13th, per Elizabeth Hyam, from Chester, 100 tons bricks, R. Martin and Co.; per Harold from Rochester, 290 tons cement, A. Agnew; per Sea Fisher, from London, 340 tons cement, Brooks, Thomas and Co., Ltd.



**Church of St. Sernin, Toulouse.**





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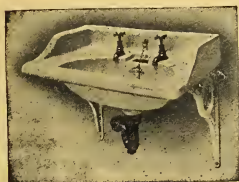


FIG. 15A. LAVATORY in WHITE ENAMELLED KINGWARE, singles, as shown, or in ranges, with 2-in. washer, vulcanite plug, 1 1/2 in. brass trap, 1 in. valves, porcelain enamelled brackets, £2 15 0. If with 2-in. rod waste, £3 5 0.



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## REINFORCED CONCRETE.

The winter session of the Institution of Civil Engineers of Ireland opened favourably on Wednesday, 7th inst., when a capital paper was read by Professor Connell Alexander, of Birmingham University, on "Reinforced Concrete." The subject is fast becoming a rather hackneyed one for engineering meetings; in fact, it would seem as though authors of papers reinforce themselves with the maxim, "When in doubt, chose 'reinforced concrete' for a subject." Nevertheless, Professor Alexander contrived to give a really excellent paper, which well deserved all the nice things said of it by the chairman and others who spoke. The subject, after all, is but in its veriest infancy, and it is still quite possible for a keen and capable experimenter like Professor Alexander to impart a vast amount of information to a general audience of engineers. Professor Alexander's paper was an admirable summary of the progress of research in this most interesting and important subject, and being by an independent engineer, not interested in any particular system or patent, was strictly impartial. Professor Alexander gave a very comprehensive series of formulæ and diagrams, French, American, and German, showing the basis of design. England, he, like other authors, pointed out, had greatly neglected the study of this important and useful new material, and he urged its study upon the younger men. At present the experts are mainly Americans and Frenchmen, though other Continental nations, like the Germans and Austrians, have kept carefully abreast of progress, while England, and, of course, still more so, Ireland, have lagged behind. Pressure on our space prevents our publishing the paper in extenso as it deserves, and an abstract

would only be mutilation. It dealt mainly with the theory of design, though many practical points were touched upon. Professor Alexander dwelt upon the necessity for careful consideration of the question of adhesion between the concrete and the steel, the bond being, he declared, a purely mechanical one, devoid of any chemical action or induced adherence, and he rather controverted the statement of Mr. Mouchel that the adherence of concrete to steel increases with age, though he did not very clearly state why. He told the meeting that the best American practice and the Prussian State regulations favoured an effective "mechanical bond," which might be provided by specially devised sections of steel, of which there are a number of varieties in use. The author insisted upon the necessity of great cleanliness in the aggregate, in which respect he differs from some rather noted American authorities (amongst whom may be mentioned Louis Carlton Sabin, of the Engineering Department of the United States Army, and author of a fine work on cement and concrete), who claims that the existence of a small proportion of loamy matter is far from detrimental to the quality of the concrete—in fact, a little loam improves it. The question of the relative coefficients of steel and concrete is a vexed one, and about which much doubt exists. Professor Alexander declared the difference to be substantial—so substantial as to call for consideration by designers. Here also he differs from some American authorities. Professor Alexander quoted Professor W. D. Pence, of Purdue University, U.S.A., who stated that he had made some experiments as to the thermal co-efficient of expansion, which resulted in showing that while the popularly accepted idea is that the co-efficient of steel and concrete are about the same, there is in reality a considerable difference between the two—a difference of perhaps 15 per cent. The co-efficient of expansion of concrete being given as 0.000,005,5, while that of steel is 0.000,006,5 to 0.000,007,0 per degree Fahrenheit. Professor Alexander observed on this that it pointed to the need for very careful consideration, especially in the design of works likely to be subjected to impulsive loads, as, for instance, on railway bridges, or floors where heavy goods are dumped down, and said he could instance many experimental beams which failed through the reinforcing rods slipping in the concrete. One floor in America failed through the dumping on it of very heavy barrels, which totally destroyed all adhesion between the steel and the concrete. Some twelve months ago we received a most admirable American work on concrete, plain and reinforced, by Mr. Frederick W. Taylor and Mr. Sandford E. Thompson, published by Messrs. John Wiley and Sons, New York, and we were struck by the same point, or, rather, the question put itself thus to us:—To what did the difference in the co-efficients of expansion amount to in practical affairs, as distinct from experimental research and theory, were they, or were they not, negligible, and with a view to elucidating this point, we entered into correspondence with the authors. Mr. Sandford Thompson very kindly went to some considerable trouble to help us in the matter, and consulted on the subject of our inquiry a number of American engineers, members of the National Joint Committee representing four engineering societies and the United States Government, which was constituted for the purpose of investigation and experiment with a view to standardising specifications and regulations for the use of reinforced concrete.

Mr. Thompson summed up by saying "that there is positively no occasion for fear, the results of experimental tests and practical experience alike indicating conclusively that where the concrete is laid of sufficiently wet consistency to completely envelop the steel, the bond of union is perfect." He, like Mr. Alexander, quoted Professor Pnce, of Purdue University, and also Professor Hallock, of Columbia University, who together made experiments, and gave the co-efficients of expansion of ordinary concrete as between 0.000,005,4 and 0.000,006,6, while the linear thermal expansion of steel was 0.000,006,6. "In other words," observed Mr. Thompson in his letter to us, "the expansion of steel and concrete is so nearly identical that it requires but very slight adhesion of the two materials to make up the difference, and in practice they are found to act together as a single unit. No trouble from unequal contraction or expansion has ever come to the writer's notice, and at the meeting of the National Joint Committee in New York last week he mentioned the subject to the other members, all of whose experiences confirm his own."

It will be here noted that Professor Alexander and Mr. Sanford Thompson quote the same authorities, but that while in the one case the co-efficient of the concrete is given as a fixed factor, in the other it is variable, due, we take it, to the difference in character of various concretes. To the ordinary engineer, not himself a practical experimentalist in the subject, the figures alone would hardly answer the question, and here the judgment of Professor Alexander, on the one hand, and Mr. Thompson and the Joint Committee on the other, deduce opposite conclusions, and from a practically common basis. It is, however, to us difficult to see that any very serious working discrepancy could prevail where the co-efficients are so similar, although Professor Alexander warned his hearers of the necessity for considering their existence, and making provision accordingly. It is, however, only common sense, now that attention is drawn to the point, to conclude that any enhancement of the mechanical bond by twisting the steel bars, by stirrups, or by otherwise treating the steel so as to increase the frictional and adhesive forces mechanically, must be a considerable addition to the practical strength and value of the combined material.

In considering this question of unequal expansion, Mr. Sanford Thompson reminded us in a letter that such effects are not peculiar to concrete, but are common to all masonry structures (and cracks have occurred in brickwork from this cause) or to plain steel structures; but owing to the smooth, monolithic character of concrete they become more prominent, while, on the other hand, they may be practically obviated by the introduction of sufficient steel to prevent the contraction forming joints or cracks in the structure, or maybe discounted by the introduction of planes of weakness, which for practical purposes are provided by laying two sections of concrete on different days, thus preventing too great adhesion, and confining the joints to straight lines, or else these joints may be specially formed as expansion joints. The fact that the cracking due to contraction and expansion can be prevented by the use of sufficient steel seems to prove clearly that the steel and the concrete act together in union.

Professor Alexander dealt ably with many other important practical considerations, which want of space prevents our adequately referring to. He mentioned

that although reinforced concrete was still on its trial, it laid claim to many practical advantages, and had some disadvantages. In the excellent discussion which ensued, these points were referred to by several of the speakers. Mr. Joseph Moore, Vice-President of the Institution, mentioned some of the popular objections, the idea that the steel corrodes, citing the bursting destruction of stonework by dowels or cramps of iron. This, of course, is largely due to the action of the atmosphere, which has frequently access to the dowels or cramps in masonry joints. Mr. Moore also threw some doubt upon the permanency of works in reinforced concrete.

As to the possibility of corrosion, the lecturer answered this by citing the experience of recent years in the special case of a bar of steel embedded in concrete, and subjected to the action of the sea and the atmosphere near Southampton, which was cut out after five years, and found as bright as when it went in. We ourselves remember to have heard somewhere of a similar case, also in the South of England, where such a bar was cut out after twelve years and found as bright as the day it went in, where it had been properly encased; but in certain parts, where the atmosphere had had access to the steel, corrosion had set in very extensively. As to the work not lasting if properly done, it is now a considerable number of years since the French first began to experiment with *béton-armé*, and still longer since that wonderful man, Viollet-le-duc, forecasted it, and there is nothing in the intervening experience to warrant alarm.

Professor Alexander described concrete as being a very rigid and hard material, and implied that it was lacking in elasticity. Such an expression is, of course, only relative, as is well known to anyone who has ever watched men breaking down good old concrete with picks, while first-class breeze concrete has a marvellous degree of elasticity. We have seen men drive a pick into a 10 inch breeze concrete wall not six months old, and be almost unable to withdraw it, the concrete yielding, but not readily bursting, under the leverage.

Professor Alexander in his remarks on expansion specially referred to floors. The difficulty is met in ordinary practice very simply in the case of ground floors by merely putting in the concrete in squares not exceeding, say, eight feet by eight feet, one square acting as a screed for the next, and so on; but every one who has had experience as a supervisor of work, of concrete floors, will unite in condemning them on practical grounds, because it is well nigh impossible to get them put in properly, honestly, carefully, and with a really first-class surface.

Professor Alexander claimed for reinforced concrete that it obviated the necessity for skilled labour, a proposition which Mr. P. C. Cowan, the Chief Inspector of the Local Government Board, rather controverted in his remarks, referring to the undoubted difficulty that exists in getting concrete properly executed, to which Professor Alexander retorted that the saving in material would more than suffice to pay for the extra supervision involved. While this may be perfectly true of certain classes of structure, it really did not answer Mr. Cowan's point at all, which was a general one, and, as he pointed out, we are unfortunately not becoming more honest in business in these days. Now, in small and remote works the use of concrete by careless, dishonest, or stupid contractors is open to grave objections owing to the ease with which fraud may be perpetrated and defects hidden. Two cases recently



came under our notice in which the use of concrete was attended with some trouble. In one, where reinforcement was adopted, the contractor was not only honest, but extremely capable and experienced. There was a good "ganger," a resident engineer, and two assistants, who relieved him, on a comparatively small job; yet at a moment when the engineer, the contractor, the ganger, the resident engineer, and assistants were on the work at the same time some of the workmen were found engaged in carelessly ramming the concrete, or, rather, in not ramming it, and on another occasion in using dirty aggregate! In another instance a somewhat scattered work of embanking in plain concrete, the engineer found it necessary to provide for the employment of no less than twelve overseers to assist the clerk of works on a small contract! Another point is that the presence of steel reinforcement, particularly certain kinds, makes the work unpleasant for the men to handle, and that the difficulty of securing effective ramming, upon which so much depends, is increased ten-fold, particularly in narrow, vertical walls with reinforcement. Therefore, the more the steel is torn, twisted, scarified, or otherwise roughened or made complicated in surface, to promote adhesion and friction, to enhance the mechanical bond, the more unpleasant it is to handle, and the more the men will be tempted to scamp the work.

Generally speaking, the discussion on Professor Alexander's paper was practical and excellent, the further consideration being adjourned to another evening. Both the paper and the discussion were amongst the very best we remember to have heard at the Institution in recent years.

## COMMENTS.

### Architectural Morals.

No reply has, so far, been made to Mr. Holloway's strong comments upon the manners and morals of architects, and, no doubt, what applies to architects does so with equal force to Civil Engineers, amongst whom we have known instances of professional sharp practice at least as bad as any that came under our notice. It is a curious coincidence that Mr. Holloway's remarks should be made just at the moment when Mr. W. J. Locke, the Secretary of the Royal Institute of British Architects, is figuring in London as the author of that highly successful and amusing play, "The Morals of Marcus," which has hit off the fleeting, fickle fancy of London society of the moment, and become one of the greatest successes of the season. Is it possible that Mr. Locke had in his mind the morals of architects!—a dark and horrible fancy!

Although Mr. Holloway's attack has met with no response, somewhat to our surprise, it has, on the other hand, drawn forth a letter from "Ulster Architect," whose card, enclosed with his letter, identifies a well-known Northern practitioner. The letter of "Ulster Architect," published in our last issue, was a somewhat personal one, and it is evident—as, indeed, he plainly states—that he has more than one particular gentleman in mind, and at whom he tilts. Under ordinary circumstances we should not publish a letter of the kind, but it offered such extraordinary confirmation of Mr. Holloway's assertions, and the matter is so important a one, and of such moment to the friendly feeling and gentlemanly con-

duct that ought to characterise the architectural profession, that we felt bound to do so. "Ulster Architect" confines his observations to Northern latitudes, and it may be that the deplorably unprofessional conduct he instances may be characteristic of a certain class of Northern architects, but that it is typical of the entire body north of the Boyne we cannot believe. As for Dublin, with which we are better acquainted, we refuse to believe, unless convinced against our will, that the types depicted by either Mr. Holloway or "Ulster Architect," are faithful portraits of the average architect, or are other than somewhat overdrawn caricatures of those black sheep whom we have always with us, and in every calling.

The practice of under-cutting in fees is a breach of faith, and a poor device to secure work, but it is honourable in comparison with the supplanting by unfair means of a brother architect. The golden rule is to ask:—"Has another architect been engaged in connection with this work? If so, has every legitimate claim of his been satisfied?" If another man has been there before, and has not been paid for his toil, then the thing should not be touched.

### Arbor Day.

There is more sentiment than real practical utility or political economy about the Arbor Day movement. Three elms, for example, planted at the back of the Custom House, may make for the future beautifying of that portion of the city, and, so far, the planting of them is to be commended. They do not, however, add to the wealth of the country. It is not the few or many isolated trees put in the ground by school children or municipal boards that are wanted, but scientific forest creation to grow merchantable timber as a crop. Our own supplies of trees are being rapidly depleted. The available wood of the world is annually dwindling, and therefore the desirable thing is at once to initiate a sensible, statesmanlike scheme of forestry. There are ample waste lands in many districts eminently suited to the purpose, lands on which no other crop will grow save poor grass and heather. It is the Government, and the Government only, which for many reasons is qualified to undertake the work. Much money will be required to do it properly, and a generation or more will elapse before there is a return. Both conditions put the undertaking outside the pale of private enterprise, and constitute a National task. That it will pay in money, in employment, in the upspringing of numerous industries, and, above all, in re-peopling deserted areas of Ireland, is as true as that the trees will annually put forth and cast their leaves. The really good thing about Arbor Day is that it will tend to awaken a widespread interest in the subject, and the movement is undoubtedly to be encouraged; but let it not be supposed for a moment that it will satisfy the hopes and demands of those interested in the re-afforestation of this island. Leafy arbors are pleasant and beautiful. They are made to be preserved. Thick forests are, perhaps, grim, silent, and even awesome, but they spell wealth, and they are made to be hewn down, and as they are cut, to be replanted.

### An Engineering Appointment.

Our contemporary, "Civil Engineering," is first to announce that Mr. James Barron, M.Inst.C.E., of Aberdeen, has been appointed engineer-in-chief to supervise the extensive new works which it has been decided to carry out at Wicklow Harbour. We do not remember to have heard of Mr. Barron before, but we

are told that he was responsible for certain important improvements at Port Henry Harbour.

When we say that it seems inconceivable that the Government could not have found in all Ireland an engineer sufficiently experienced and trustworthy to carry out these works, important enough, but after all not appalling in extent, we trust we shall be acquitted of any discourtesy towards the gentleman appointed, who, we have no doubt, is in every way well qualified to carry out the work.

In Ireland we gladly welcome all new recruits, English or Scotch, whether architects or civil engineers, and particularly when they make their home amongst us; but, candidly, is there not fair ground for complaint when we see almost every "plum" given away to non-resident English or Scotchmen, who are certainly, as a rule, not better qualified than Irishmen.

The average man does not enter the profession either of an architect or an engineer in this country in the hope of making a large fortune: if he does, he is a fool for his pains; but the hard-working, educated, and capable members of both professions might reasonably look forward to a modest livelihood as the result of their professional labours; and surely it is very discouraging to find nearly all the more responsible, interesting, and lucrative works entrusted to Englishmen or Scotchmen, not as the result of any fair and square open competition, but as the outcome of influence with the powers that be.

There are, it is perfectly well known, plenty of capable engineers and architects in Ireland, and yet we find the new College of Science, the Wicklow Harbour, and many other works given away to gentlemen who, after all, are more or less foreigners. Appointments such as these are an insult to the Irish Institutes, and ought to be resented. In what precise form the Institutes might, with self-respect, resent the form of procedure adopted is more easily suggested than defined.

As touching this subject, it may not be out of place to remind our readers of the light in which English architects themselves view the mere possibility of the appointment of a non-Englishman as architect or engineer for an important work in England. It will be within our reader's recollection that some time since the London County Council, which is the governing body of a population largely exceeding that of Ireland, determined to build themselves a central and palatial grand hall and seat of metropolitan government at a cost of over a million sterling, for which purpose they had acquired a considerable tract of land upon the Surrey side of the river opposite the Embankment. It will be observed that, even as big projects go in London, the scheme is one of the most important conceived during recent years, and cannot by any means be denominated a mere parish or vestry affair. Deeming, and rightly deeming, the matter of international importance, the Council decided to throw the scheme open to the competition of the world. This at once aroused much indignation, and several English architects wrote to the daily and professional papers with considerable warmth against any but an Englishman being allowed to compete; but it was reserved for the President of the Royal Institute of British Architects to sum up this feeling of indignation. Said he:—

I think it is a matter of congratulation that the London County Council have decided to institute a competition for the building of their proposed County Hall. But I learn with dismay that it is their intention to make it open to architects of all nations.

There is no precedent for such a course; and I think a vigorous protest should be made, in the interests of both the English public and the English architect, against a course which appears to be unnecessary and unjust, and which *no other nation* would think of adopting. It is no question of dislike to meet our foreign brethren in com-

petition that prompts this protest; it is that I feel that an international competition would be a direct slight to English art, and that it is to the English architect we must look for the production of a design that will illustrate the best traditions of English work.

These observations require no added comment.

### The Fire at Selby Abbey.

An investigation before the Chancellor of the Diocese took place last week, and, from the evidence elicited, there seems little doubt but that the fire at Selby Abbey was due to the carelessness of the organ builder's workmen engaged in putting up the new organ, about the destruction of which such ridiculous fuss has been made. Some of the men had been seen smoking, while others had been at work with naked candles, which, it would seem, is a custom of the trade, and one which it is about time to change. The fire rapidly gained a great hold owing to the fact that the place was locked up, and the keys, it is said, being kept at a distance, could not be procured very quickly. Why the doors or windows were not broken open does not transpire from the report. The beautiful choir stalls were destroyed, chiefly by reason of the burning timber roof falling on them.

The enquiry really brought out no new facts beyond those above recorded, and the only recommendation was one recommending greater care, the disuse of naked lights, and the retention of the keys nearer at hand. The fire was also facilitated by the want of an adequate water supply promptly available.

The restoration of the fabric will, it is believed, cost £50,000, and much controversy centres round the proposal to reproduce the destroyed timber ceiling, many advocating stone vaulting. As the Church was undoubtedly originally designed with that end in view, and the greater diminution of the risks of fire, would seem to amply compensate for any comparatively slight additional cost—not to speak of the nobler appearance produced by good stone groining.

### KNIGHTHOOD FOR THE ARCHITECT OF THE CITY HALL, BELFAST.

His majesty the King has been pleased to include the name of Mr. Alfred Brumwell Thomas, of London, amongst the recipients of the birthday honours, a knighthood being conferred upon Mr. Thomas. Irish architects will unite in rejoicing at the honour which King Edward has conferred upon Mr. Thomas, because he has well earned it by his masterly design for the new City Hall, Belfast, excellently conceived and well carried out.

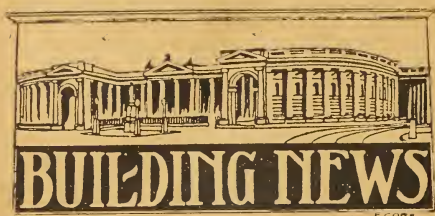
The tender of Messrs. H. and J. Martin has been accepted for the construction of a reservoir, etc., at Ballysallagh Major, and for laying pipes for the Bangor Urban District Council. Messrs. L. L. Macassey and Sons, engineers, 7 Chichester Street, Belfast. Quantities by Mr. S. C. Hunter, Scottish Provident Buildings, Belfast. The amount of the tender was £16,398.

The same firm are engaged upon the preliminary work, clearance and foundations, and certain rising walls now proceeding at the new College of Science in Upper Merrion Street, Dublin.

**Belfast.**—Messrs. Hanna and Brown are about to erect a new warehouse and showroom in Arthur-street and Callender-street. Plans have been prepared by Mr. T. W. Henry, Ocean Buildings, Belfast, and the surveyors are Messrs. W. H. Stephen and Sons, Donegall-square, North, who will receive tenders up to 21st inst.

In another part of this issue the Local Government Board for Ireland invite the submission of designs suitable for the erection of Labourers' Cottages in Rural Districts throughout Ireland under the Labourers' Acts. They are prepared to award premiums of £50, £30, and £20 for the three best designs.





**Abbeyleix.**—The Local Government Board have granted a provisional order enabling the Abbeyleix Rural Council to proceed with the building of 46 labourers' cottages amongst the various electoral divisions.

**Belfast.**—The memorial stone was laid last week of the Ladies' New Industrial School in Lancaster-street. Messrs. M'Dowell, Leatham, and Fraser are the builders. The materials used are red brick (Laganvale) and cast concrete dressings; these are proving a great success, and the work looks very well, indeed. Messrs. Blackwood and Jury are the architects.

Messrs. Robert Corry, Ltd., of University-street, Belfast, are at present engaged in the erection of a large block of shops and offices at Arthur-square, Belfast, for the Arthur Square Development Co., Ltd., the architects being Messrs. Blackwood and Jury. Also, a new factory for Messrs. M'Bride and Williams, of Belfast; architects, Messrs. Young and MacKenzie, of the Scottish Provident Buildings. They have recently secured further contracts for building extensions at the Queen's College, Belfast, for the Board of Works, the plans and specifications being prepared by Mr. R. Cochrane. Messrs. Corry have met with considerable success in the granite sawing and polishing department of their business, which they opened over a year ago, and have added further special machinery for doing this class of work. We recently inspected some Castlewelling granite and Swedish stone which they were engaged in sawing and polishing. The workmanship and finish appeared to be excellent in every way.

**Ballyhackamore (Co. Down).**—Six hundred pounds were subscribed at a representative meeting of the Catholics of Ballyhackamore, held for the purpose of inaugurating a fund for the erection of a church in that new parish, which is in the suburbs of Belfast. The Rev. Henry Skeffington has been appointed the first Administrator. His Lordship the Most Rev. Dr. Henry addressed those present, and said the present intention was to erect so much of a parochial church as would provide sufficient seating accommodation for the increasing Catholic population of the district. They hoped to be in a position to begin building operations in the spring of next year.

**Dundalk.**—The Great Northern Railway are about to build a two-storey stores building 181 feet in length by 50 feet in width, with steel principal roof and steel girder supported floor; also offices 34 feet long, according to the plans and specifications of Mr. W. H. Mills, engineer-in-chief. Tenders close in December.

**Dublin.**—It has been decided to erect a new "Home" in connection with the Orphanage of St. Vincent de Paul, Glasnevin. The work will be carried out from the designs of Mr. J. P. Wren, 180 Great Brunswick Street, Dublin.

Alterations are being made in the Jewish Cemetery according to the designs and specifications of Mr. J. Hampden Shaw, of 9 Westmoreland Street, Dublin. New waiting rooms are being built, and dressing-rooms for the Rabbi's vestry.

New premises for Messrs. M'Donoghue and Co., victuallers, 11 Chatham-street, city, are now in course of erection. The piers are of polished Newry granite and form a distinctive feature of the building. The other dressings to windows, parapets, etc., are of chiselled limestone and Portmarnock bricks. In fact, everything possible and suitable for the building is of Irish manufacture, and in the different trades are a credit to Irish workmanship. The buildings are in the hands of Messrs. Wm. Connolly and Son, and under the supervision of Messrs. M'Carthy and Anderson, architects and engineers.

Mr. Joseph Lamb, building contractor, Ballsbridge, has secured the contract for a number of cottages at Phibsborough for Mr. James Allen, Cabra, and the work is being carried out under the supervision of James Dougan, C.E., Sandymount.

Messrs. J. and R. Thompson have secured the contract for the construction of New Duty Free Warehouse for Messrs. J. Jameson and Sons, North Anne-street, to the

plans of the company's engineer, Mr. Cairnes. The greater portion of this work will be in ferro-concrete (Hennebique's patent), floors, pillars, and upper walls, while the roof will form a water tank.

**Dalkey.**—At a meeting of the Urban Council, Mr. Fullerton proposed, and Mr. Smallman seconded, a resolution adopting the scheme which provided that the portion of the area immediately fronting Castle-street, of about 700 square feet, be devoted to the widening of Castle-street at that point; that 65 feet of a frontage to Castle-street at a depth of 84 feet be let or sold for building good class shops or other premises; a properly, well-equipped public convenience be erected at the extreme end of Molloy's-lane; that twelve houses be erected in Greenmount-lane at a weekly rent of, say, 3s. 6d.; twenty-four houses in the form of a square, with an enclosed playground in the centre, and opening at the south-east corner to the railway bridge, to let at weekly rents from 2s. to 3s. each; that Mr. J. J. McDonald be appointed solicitor for the purposes of the scheme. The estimated cost of the scheme is £6,700.

**Kingstown.**—Tenders are invited for the lighting and plumbing of the new Technical Schools, Kingstown; also separate tender for heating. Tenders close November 20th.

**Limerick.**—St. Joseph's New Road.—Some time ago his Lordship the Most Rev. Dr. O'Dwyer, who is full of enterprise, bought a large piece of land, half of which was formerly an extensive orchard, and the other half a field. This place in the "forties" was almost a suburban tract, but is now surrounded by houses. His view was to provide building sites, and for this purpose he employed a large staff of workmen, under officials, and made an excellent road leading from Edward Street to St. Joseph's Church. From this road four avenues are leading off at right angles. Perfect sewage is laid for the accommodation of 70 houses to be built thereon. At present there are five in progress, and at the opening of the New Year a big stir is expected in the building trade in this quarter, which is one of the healthiest in the city.

The Board of Guardians of the Limerick Union recently invited tenders for the erection of two sanitary annexes at the workhouse, viz., one for the fever hospital, and the other for the general hospital. The work is to be done in accordance with the plans and specifications of Mr. Joseph O'Malley, the guardians' engineer. Tenders closed on 14th inst.

**Nenagh.**—An important work is in course of erection by the addition of transepts and a chancel to Borrisnafamey Church. The new work has a buttress at the angles. A neat tracery window, with a mullion and quatre-foil head, adorns the chancel. There is also a new doorway and cut stone barges to the gables, etc. The transepts are divided off from the nave by handsome screens of woodwork, with doors in centre. The lower parts are panelled, while the upper are divided by Gothic heads springing from the framing. The design is by Mr. Joseph Fogarty, architect, Henry Street, Limerick, and the contractor is Mr. J. Bourke, Nenagh.

**Roscrea.**—The Directors of the Roscrea Bacon Factory, Ltd., invite tenders for the following works in connection with the erection of a new bacon factory at Roscrea, Co. Tipperary:—1st—Excavations, foundation, concrete floors and walls. 2nd—Corrugated Iron buildings, or alternatively buildings, with Belfast felt roofing. Tenders to be submitted by 1st December.

**Wexford.**—The Corporation of Wexford have received tenders for repairs to be executed on the Town Hall.

Messrs. J. and R. Thompson are carrying out extensive alterations to "Avondale" House, Rathdrum, for the Department of Agriculture, and have been instructed by the same body to erect a ferro-concrete water tower, 45 feet high, of 15,000 gallon capacity at their farm, Athenry.

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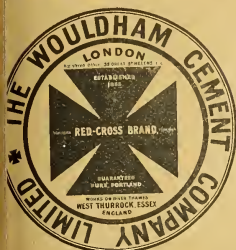
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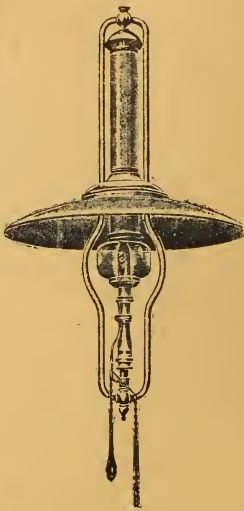
## THE WELSCHACH.

In these days of almost universal incandescent gas lighting it is hardly necessary to introduce the name Welsbach to our readers. The Welsbach mantle was, of course, the pioneer of inventions for the burning of gas in a state of incandescence. We are certain that it was the first really practical mantle, and that any thing since introduced has not surpassed it—if, indeed, it has come up to the same pitch of excellence. Although the name Welsbach is most generally known in connection with the mantles, the firm is identified to an equal degree with the making of burners and other accessories connected with incandescent gaslight. Starting with their original burner, they have improved it into what is now known as their "C" or ordinary type, while their latest and most scientific products are what are known as the Welsbach Kern. These are designed to give considerably more light per cubic foot of gas than the "C" type, and have the important advantage of requiring no chimney. For various purposes several sizes and varieties are manufactured, but the Welsbach Kern lights may be divided into three main types—namely, the usual upright burner, the inverted burner, and the self-intensifying lamps. Of these the inverted burner has proved a great success, but the most noteworthy is the Self-Intensifying pattern. For interior lighting there is nothing to beat these lamps, and they are becoming quite familiar objects in this city. They are easily recognised by their bulb-shaped glass, long metal funnel, and, above all, by the intense light they give. The Company has had a phenomenal demand for these lamps, the Dublin Gas Company alone fitting them in thousands.

The Company are also specialists in every variety of gas-fitting and accessory, including globes, pendants, brackets, shades, etc. Another direction in which the Kern burner has been applied by the Welsbach people is for heating and cooking purposes, especially in the production of their patent radiators. So many varieties of these are produced by the Company that it would be hopeless for us to attempt to describe them. One most important fact we may, however, mention—namely, that analysis proves that in the Kern Radiator the combustion of coal-gas is complete, and without the production of these partly burnt gases or escaping unburnt gases, which are injurious to health. In no instance has the deadly carbon monoxide been found either in the gases escaping from the flue or the air of the room. The result speaks highly in favour of the Kern burner as a hygienic means of warming and maintaining the temperature of a room, whilst the consumption of gas is something like 20 per cent. less than in any other type of gas fire.

Our readers may inspect these radiators, and all other Welsbach specialties, at Messrs. Baxendale's warerooms, Capel Street; Messrs. Brooks, Thomas and Co., Ltd., 1, Abbey Street; and W. Curtis and Sons, Ltd., Mid. Abbey Street, or may, of course, obtain full particulars from the Welsbach Incandescent Gas Light Co., Ltd., 2 to 14 Palmer Street, Westminster, London, S.W.

The Bostwick Gate and Shutter Company, Limited, of Gray's Inn Road, London, W.C., have recently supplied the Ritz Hotel with some of their polished Delta collapsible gates.



## OUR SOUTHERN LETTER.

(FROM OUR CORRESPONDENT).

## Blackrock Navigation.

A public meeting has been held in Fermoy to consider the feasibility of deepening the River Blackwater, and rendering it navigable to Fermoy. It was pointed out that one difficulty to be met with was the portion of the river between Fermoy and Lismore, on which there was a fall of 42 feet, which would necessitate the construction of locks.

Between Cappoquin and Lismore there was only about two and a half miles of the river which would require deepening.

As far back as the year 1750 there was a scheme proposed for the same purpose at an estimated cost of about £24,000. It was pointed out that such a sum of money now would only meet the purchase of the fishing rights and protection of the milling interests, and also that the competition with the railways was a question to be dealt with. After some discussion the project was approved of, and a committee appointed to bring the matter before the Royal Commission appointed to look into the present condition of canals and waterways.

## Reclamation of Slob Lands.

The Cork Harbour Board had before them a scheme for the reclamation of certain slob lands north of the Little Island, around which island portion of the tidal waters of the River Lee at present flows. The Harbour Engineer opposed the scheme as he considered it would affect the scour of the river at Monkstown Bay, and also at other parts of the harbour. It was agreed that the Board should name five important harbours in the Kingdom, and that the promoter of the scheme, Mr. T. Donovan, T.C., should select the engineer of one of them, who should be asked to give his opinion on the matter, the cost to be borne jointly by the Board and Mr. Donovan.

## A Liberal Offer.

The Clonakilly Rural District Council received a letter from a civil engineer in Bournemouth enquiring whether the Council would be prepared to consider a scheme for supplying water to Courtmacsherry if placed before them. After some discussion, it was unanimously agreed to request Mr. Johnson Travers, C.E., to prepare plans and estimates for improving the existing tank and reservoir, so as to increase the supply to Courtmacsherry, and the Clerk was directed to inform the engineer in Bournemouth that the Council would be prepared to consider his scheme provided they incur no expense in the event of their not approving of the scheme.

## General.

The Cork Corporation have decided to apply to the Local Government Board for a loan of £6,000, to be expended in improving the lanes and alleys in different parts of the city, in accordance with the Public Health Acts, and for which purpose a sworn inquiry will be held, and the different wards were requested to send in reports as to the requirements of each ward.

The Youghal Urban Council are applying to the Local Government Board to sanction a loan of £1,200 for the purpose of constructing a sewer in connection with the Auxiliary Asylum and the plans of which had been approved by the Council.

The Middleton Rural District Council are receiving tenders for the purpose of carrying out certain improvements to the Carrigtohilly Waterworks, in accordance with plans and specification prepared by Mr. Richard Evans, C.E., Cork.

The Cork County Council propose to extend the pier at Cahirkree at a cost of £450, £300 of which is to be contributed by the Congested Districts Board, £100 by the county at large, and £50 by the Rural District of Castletownbere.

A company has been formed at Roscrea for the purpose of erecting a new bacon factory there. The capital, which has nearly all been subscribed, amounts to £10,000.

The total cost for land, buildings, and machinery will not exceed £6,000. The capacity to start with will be about 500 pigs per week, and with very little additional cost this quantity may be increased to 1,000 per week.

The lands have been acquired, and the plans and specification prepared.

A strange accident occurred last week in one of the London docks. The "Eva" was discharging a large cargo of spruce and pine deals, which were being piled on the quay-side as the discharge proceeded. When all the timber had been nearly put out, several piles of deals for some unexplained cause suddenly collapsed, and were, along with half a dozen men, precipitated into the water. Several of the men were injured, but, happily, none fatally. At the lowest estimate, 300 standards were in a moment sent floating all over the dock. It will take a long time to get them back on to the quays, as each piece will have to be separately handled.



# ENGINEERING SECTION.

## ITEMS.

The recent Municipal elections in London are an indication of the stupendous upheaval which occurs in the minds of a community when a distasteful policy is proceeded with for a considerable time. For years past the Progressives, a body which identified itself in prejudiced fashion with the claims of labour, have held majorities on the Borough Councils, and have gradually increased the rates by expenditure not always fully warranted by the necessities of the case. The Poplar enquiry is too fresh in public recollection to need recapitulation, but it was only a lurid incident out of many. At last Londoners felt they had had enough of a spoon-feeding policy, with the result that the Municipal reformers have carried all before them, unfortunately to such an extent in some localities as to obtain the whole representation of the Council. London Municipal politics are, perhaps, of little interest to us in Ireland, but the recent revolt of the ratepayers may hold a pregnant warning to some of our own authorities, who revel in vast majorities, which they fondly believe must so remain for all time.

\* \* \* \*

Colonel Yorke's report on the Highgate tram disaster will prove of use to bodies owning tramways, to whom a careful study of his findings is commended. The serious accident which occurred, was caused by a run-away electric tram on Highgate Hill; the brakes of which being suddenly applied, locked the wheels, and caused them to skid, without effecting an appreciable diminution of speed. Colonel Yorke calls attention to a fact which is likely to be overlooked, when he states that a modern tramcar, when fully loaded, may weigh sixteen tons or more, and may carry as many as seventy passengers, which is as large a number as is often found on a railway train. Moreover, a tramcar travels along a road full of traffic of all descriptions, affecting thereby the safety of the general public, thus differing materially from a train in which the care of the passengers is alone the concern. Yet the problem of braking trams has received but little consideration compared with that of braking trains. He further points out the weakness of the usual type of block brake, applied through a series of chains, rods, and levers, and released by a spring, which in the case of a jam, would naturally fail to act. He considers that every car should be fitted with a form of screw brake, which will enable the pressure to be gradually applied to the blocks on the wheels, and as gradually relieved, without having to rely on a back spring; at the same time reducing the amount of the physical labour which has to be exerted by the motor man. Colonel Yorke is apparently no believer in the efficiency of the track brake, considering that it should be but a supplement to the wheel brake. An unusual feature of the Highgate accident is brought out in the report. It appears that finding his brakes jammed, the motor man jumped from the car without taking other elementary precautions to stay his flight, and left it to proceed to destruction. It is probable that being but newly-appointed, and without a proper knowledge of the appliances to his hand, his nerve utterly failed him, a charitable view of his conduct which is expressed in the report.

\* \* \* \*

The President of the Institution of Civil Engineers, Sir Alexander Kennedy, in his opening address on Tuesday, dealt with the wide difference which must naturally exist between the artist and the engineer. The recognition of the gulf which divides the two professions of architecture and engineering, coming from such a source, should have an important effect on the representative body of engineers who were present. He pointed out that as soon as engineering works were treated on their own merits, and not as if they were a mistaken imitation of other things, it would be found that an intrinsic artistic value could be obtained. It would be well if this advice were followed, and large engineering structures claimed beauty for their general form, strength, grace, and simplicity, instead of relying, as they now so often do, on a plaster of ill-designed "ornament," utterly unsuited to its purpose, and generally evincing an entire lack of artistic feeling on the part of the perpetrator. Engineering works should inspire by means of their force and grandeur, and to illustrate his remarks Sir Alexander instanced the Dreadnought; the new Atlantic type of locomotives may also be quoted as objects of admiration by reason of the foregoing qualities. If the latter were covered with a cast-iron diaper pattern, and further elaborated with curves and eccentricities, on the approved principles of *l'art nouveau*, the result would be appalling. Indeed, architects might themselves learn

a valuable lesson from their professional brother. The engineer, whose constructive genius, limited, as a rule, to the use of iron and steel, wins regard by a strict adherence to utility.

\* \* \* \*

The President will carry many with him when he stigmatised the mountain railways of Switzerland and Snowdon as products of tourist madness, wholly unnecessary, of no public benefit, and in many cases likely to cause irreparable damage to natural beauty. He also urged, that as there is a peaceful outlook at present, with no industrial strikes apparently pending, opportunity should be taken to establish joint trade committees to act, when necessary, as arbitration tribunals. In the disputes between capital and labour engineers could do much in the direction of peace by promoting the idea of solidarity of the latter, and the common welfare of all who worked, whether by head or hand, or both.

\* \* \* \*

Last July the Select Committee of the House of Commons rejected the Electric Supply Bill of the London County Council, stating at the same time that "the best means of providing for the supply of electrical energy, in bulk, and for power and motive purposes, is by one large and inclusive scheme extending over not only the entire County of London, but also to the adjoining boroughs and districts." It was further recommended that the County Council should be the central authority, and that a decision on this urgent matter should be reached quickly, so that a Bill might be laid before Parliament early in 1907. To comply with the request the Highways Committee have drawn up a scheme of electricity supply of extensive scope, which was recently discussed by the Council, and it was resolved that Parliamentary powers should be invoked to carry it out. There is little question that, if the proposals be considered apart from the influence of political bias, the merits of the scheme will meet with general approval, including as it does the hiring out of small motors to turn lathes, and the minor plant to be found in the smaller workshops. The area of supply in London proper is 117 square miles, but a district of 334 square miles of the suburbs will be included. By centralising the generating stations under one comprehensive scheme the duplication of plant, buildings and officials will be saved, and, what is of equal importance, the pollution of the atmosphere with smoke from numerous chimneys will be appreciably lessened. The present generating stations will be utilised for the purpose of distribution, and having them to hand will decrease the initial capital outlay. The existing tramways' sub-stations will also contribute towards economy in this direction. The cost of the first section of the station, including the site, is estimated at £1,600,000, and the cost of the mains, distributing systems, etc., will be about £2,650,000, in which sum is included the purchase of the motors, radiators, and other appliances, which can be hired by the consumer. Whilst the London County Council often lays itself open to criticism in the work which it undertakes, it would appear that the broad outlines of the electricity supply scheme are to be commended. The proposals will, doubtless, if put into practice, have a far-reaching result on the conditions of labour and the output of the factories, by bringing the cost of electricity for power, light and heat within the reach of many, to whom present prices, fixed by dividend earning companies, are prohibitive.

\* \* \* \*

The advent of Mr. John Burns to the Local Government Board has resulted in a far keener scrutiny of the expenditure of the English local authorities. It is a regulation that when a disbursement has been decided to be illegal by the auditor, those directly responsible shall be surcharged. But from time to time the Local Government Board has availed itself of its discretionary powers to permit the expenditure, or, rather, to allow it to be met out of the rates, instead of out of the pocket of the harassed councillor. A complete change of policy is, however, now noticeable. The President will have no toleration for slackness, and the avenues of escape from surcharge for improper expenditure have been practically closed. A curious point has, therefore, arisen. By the wording of the Act, "the persons making illegal payments" are to be surcharged, and in a recent decision it was held that the Local Government Board's determination was final, and could be upset in no court of law. In the case in question, those who signed the cheques were held liable. But in another case, in Scotland, the intention of the Act was more rigidly defined, and it was held that the persons responsible were those who actually paid



the money, viz., the Clerk and the Treasurer. The circumstances under which the accounts were paid were certainly peculiar, making it difficult to fix the responsibility on individual members of the Council. But, the duties of a public official will become extremely onerous if he may be held personally liable for the payment of accounts which the auditor may subsequently consider as improper expenditure. That an executive officer can be fined for obeying the instructions of his employers, is a situation perilously akin to farce.

#### ABOUT MAHOGANY.

The mahogany is noted as being one of the most elegant, if not the largest, of the native forest trees in the country in which it is found. Strangely enough, it is quite frequently found high up in the crevices of rocks. The appearance of such a large tree in such an unusual position is both curious and picturesque, and is accounted for by the fact that the seed is winged, somewhat like that of the thistle, and in this way finds a lodgment in these lofty locations. As long as the tree remains small, sufficient room is found in the hole or fissure where it has taken root, but as it increases in size it very often heaves the rocks asunder by the force of its steady but irresistible growth, and breaks off huge fragments, which are often found below.

The largest and best timber, however, is not found in such locations, but in some of the flat and marshy places along the coast. This is the Honduras mahogany, which is consequently looser in texture and inferior in value to that found in the mountainous parts of Cuba and Hayti.

The introduction of this wood into England is said to have taken place about the end of the 17th century. A London physician by the name of Gibbons had a brother who was captain of a West India ship. In one of his trips to England he brought a number of logs of mahogany on board his vessel as ballast. These he made a present of to his brother for building purposes. The carpenter, however, threw it to one side, remarking that it was too hard to be worked. Mrs. Gibbons, happening to be in want of a box to hold candles, instructed her cabinet-maker to manufacture her one out of the rejected material. He, in his turn, put up the same objection to it that the carpenter had, saying that it spoiled his tools. He was finally prevailed upon to make another trial, and produced a box which, when polished, was of such beauty that it was the object of much curiosity and attention. The Duchess of Buckingham, who happened to see it, ordered a bureau to be made of the same material.

Previous to this it had only been used to a limited extent for ship-building, but the discovery of its beauty for cabinet-making purposes soon brought it into general use.

#### ANSWERS TO CORRESPONDENTS.

##### Engineering Grinder.

**J. T. Rooney.**—We do not know of anyone in Ireland who makes a speciality of preparing pupils for architectural or engineering exams. Mr. G. A. T. Middleton, A.R.I.B.A., of 19 Craven street, Strand, London, W.C., has been a most successful "coach" in these matters, and would "grind" you by correspondence.

Much distress still continues in the building trades in Dublin, very many hard-working and deserving men being unable to secure employment. The outlook for the winter is very black, indeed.

The building trade in the Scottish capital would seem to be no better than it is with us. The unlet property is on the increase in Edinburgh. Last year it amounted to 3,800 dwellings, and it is estimated that at the end of this year the number of unoccupied houses will be 5,300. So far as we know, no similar statistics are compiled in Dublin. It would be interesting if the Rates Departments of the city and suburbs were to make up the figures of the vacancies from their rate books, and give them annually to the public.



#### ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS

The annual smoker was held in the Four Courts Hotel on Tuesday night, and went exceedingly well, despite a late start and a recalcitrant fire at one end of the room, which made a fine bonfire, though a bit late for the 5th November. A good deal of the talent was furnished by the Association itself, though reinforced by friends. Amongst those who contributed were Messrs. Beckett (pianoforte solo), F. G. Hicks, who gave several of his popular favourites, "In Alaca of Old," and several other acceptable items; Furlong, R. Turner, who sang "She's my Own;" Mr. Fred Jeffs, whose comic songs and "patters" are so popular at Dublin "smokers;" Bruton, Cecil Mitchell (topical songs), etc. The Treasurer gave an interesting performance at the warmest end of the room, his contributions to the evening's entertainment being much appreciated by the surrounding company. Mr. Goff gave that fine old classic "Dr. Faust and the lovely Maguerite." Last, but not least, the chairman, our president, Mr. Holloway, contributed "Conn's Description of a Foxhunt," and another of his own particular recitations, which never fails to go splendidly. The operation of the stringent new licensing laws unfortunately brought the evening to a close just as it was getting into full swing and going really briskly. The arrangements were in the hands of a committee consisting of Messrs. Sparrow, Dickenson, Ramsay, and Tallon, who may be congratulated on the success of the evening. The smoker was brought to a close by a painful effort on the part of one member to render the "Association Anthem," the failure of which was somewhat relieved by a more happy rendering of "Auld Lang Syne," amidst which, and cheers, the assembly slowly dissolved.

\* \* \* \*

The lecture on "Domestic Architecture," by Mr. Gotch, who travelled over from England in the teeth of a northerly gale, was listened to by almost a record audience, with the greatest attention. The subject, always one of interest to architects, was, as may be expected, treated in detail in such a manner as to trace the gradual development of the modern home from the feudal castles of the Conquest. Mr. Gotch is probably the greatest living authority on the subject of which he spoke, and his remarks were illustrated by a splendid series of lantern views. Unfortunately the lantern exhibited a disposition to jib, and even the new scheme of ventilation could not cope with the sustained efforts of tobacco-loving architects, but, in spite of the few drawbacks, the lecture was most enjoyable, and Mr. Gotch had no reason to complain of the "Cead Mile Failthe" which the President of the Royal Irish Institute and the Association offered him.

\* \* \* \*

It is to be hoped that Mr. Gotch will again soon visit Ireland, for an English lecturer is a *rara avis*, and always draws a large audience, generally to their benefit and interest.

WEE MACGREGOR.

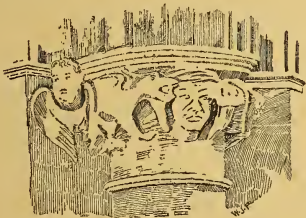
# IN AND AROUND DOWNPATRICK.

(By W. J. FENNELL, M.R.I.A., F.R.I.A.I.)

Downpatrick, the capital of the beautiful County of Down, on the east coast of Ulster, has all the appearance of a well-built, prosperous town, blessed with a good market trade; and twice a year it gains the additional importance of an assize town, which function of the law is so dear to the heart of an Irishman.

Downpatrick is also the happy possessor of a cathedral, a courthouse, a convent, a county jail, a workhouse, and a lunatic asylum; yet, notwithstanding the refining influences of such advanced civilisation, there are the usual Ulster distinctions of creeds, carrying enlightenment and love on the one side, and intolerance and distrust on the other; but as each side claims to be the sole possessor of the enlightenment and the love, the town is seldom disturbed by the fierce conflicts that periodically sweep down on some of the more fervid districts of Ulster.

The natural formation of the site of Downpatrick, surrounded by a circle of hills on three sides, and the low-lying inches of the River Quoile on the fourth side, gives the town a strikingly picturesque appearance from any point by which it is entered; while as a sentinel over all rises, on one of its hills, the Cathedral Church of St. Patrick, awakening in a moment the memories of its past. This cathedral once formed a portion of the church of the Benedictine monastery. It is into these shadowy memories that the antiquary would like to penetrate, and to enter into their world of romance; for, while some portions of their history are well authenticated, there are relics existing connected with that early time in Ireland whose history, we deeply regret, must ever be one of shadows.



From an archæological and ecclesiastical point of view, Downpatrick, as one of the earliest fields of labour of St. Patrick, as well as his last resting-place, is of great interest, and these events rendered it a cherished Mecca from the fifth to the twentieth centuries. Close to Downpatrick is a townland known as Ballintogher, in the parish of Saul (from Sabhab, a barn), possibly a nickname for the humble church erected there. It was somewhere about this spot that St. Patrick landed after his escape from captivity on Slemish, in Antrim. He founded the first Christian church in Ireland at Saul, and from it commenced the mission of the "Early Church of Ireland," whose power swept over England and through France, Switzerland, and on to Italy. That St. Patrick dearly loved his starting-point and Downpatrick must have been but natural to the man. The beauty of the wooded banks of the winding Quoile, the sunny hills of Down, the purple of the distant range of the Mourne Mountains, make one of those dreamy pictures of Ireland that became sacred to the early Fathers. In those days a forest covered all the hills, which are now cultivated homesteads, but the splendours of Nature's pictures still remain as striking as when the eyes of St. Patrick first beheld them in the land of his adoption.

The material relics of that distant time at Saul have all vanished—even the foundations of his first church, to which he at last returned, wishing to die where his work commenced.

From Saul St. Patrick soon advanced westward to Downpatrick, where he found the great stronghold of a pagan chief. It still exists—an enormous conical rath, with outlying protective ramparts of earth, in the low-lying fields on the north side of the town, but in those times little better

than marshy swamps, and passable only to those who understood the bearings of the causeway leading to it, so that it had practically the defences of an island fortification. Even now the ruin of this stronghold impresses one with its importance, and St. Patrick would naturally try to bring its ruler under his spiritual sway before he journeyed on to other triumphs. This great Dun, or fort, "is referred to as Airceathair (the habitation of Cellchar) under a date as early as A.M. 4169 (1039 B.C.) in the Annals of the Four Masters." In St. Patrick's time it was known as Dun-lethglas, and contracted to Dun in everyday use; soon it became "Down," which in after years, with the addition of the patron saint's name, became general in use, and finally was adopted as the name of the town.

If we take the line of hills as forming an arc of a circle on the north, east, and south sides of the town, and the Quoile to constitute the chord on the west side, we gain a fairly accurate idea of the situation. On the extreme north point of this arc of hills stands the cathedral, commanding the town and the valley of the Quoile. It was on this spot that St. Patrick is said to have founded a church, close to and overlooking the pagan fortress. It is hardly likely that he would have passed on to his field of greater action without first sanctifying this important starting point. At all events, his immediate followers occupied a church there, and beside it built a lofty round-tower, the precursor of a distinctive form of architecture that became national in its type.

The church vanished under the Norman rule, but its round-tower was left. The Normans had, as Paddy would say, "a respect for the likes of thim." Their builders recognised their supremacy, and left them for more advanced and cultured ages to destroy. The church was burned by Edward Bruce in 1316, and rebuilt in 1790. At this date the round-tower was standing, but sadly mutilated. A poorly-executed oil-painting in the church is a record of it, and but for this we should doubt its existence. The restoration of the cathedral took place at a time when little regard was paid to such things, and when the work was finished the round-tower had vanished. No doubt it was very useful as a quarry for the new tower—and what could be more perfect than the square towers of the latter portion of the eighteenth century! Enough to justify the razing of a round-tower! Thus faded the last material glimpse of the early church at Downpatrick; but in the graveyard there is one spot whose sacred charm has never faded—the traditional spot where the patron saint of Ireland was laid to rest. This grave is in about the centre of the graveyard, on the south side of the church, and is doubtless the site of his own primitive church, in which it was said he was buried.

For many years it was the custom of emigrants to take a little mould from this grave as a charm, or a token of the hallowed place, and to carry it with them in their wanderings to the uttermost places of the earth; so that an additional cart-load of earth had to be imported occasionally to maintain the level of what appeared to be a wretched, neglected grave. To remedy this state of affairs the members of the Archæological Section of the Belfast Naturalists' Field Club took the matter in hand, and had a foundation of concrete put into the grave, and on it was placed a granite boulder, selected from one of the mountain-sides of the Mourne range, as a memorial, such as might have been adopted in those early days. This stone weighs seven tons, and is unwrought, presenting nothing but a weather-beaten surface, on which is incised the name "Patric" in letters copied from the most ancient Celtic books, with the date of the Saint's death, A.D. 469, and a primitive Irish cross, copied from a slab discovered on the island of Innisclothran, in the Shannon.

Another work of the same club was the collection and the re-erection of the widely-scattered fragments of the High Cross of Downpatrick at the east end of the cathedral grounds. This cross is cut out of coarse granite, and has been badly used; it is much weathered. It presents on its face a sculptured panel of the crucifixion, and on its sides



some of the interlacing work of the Celtic period which was so earnestly fostered by St. Patrick's successors.

The Benedictine Monastery of Downpatrick was founded by Sir John De Courcy in 1183, the Norman baron who managed to obtain most of the County of Down for himself.



De Courcy appears to have left his mark nearly all round the county, and judging from the belt of castles he built to defend his property he must have had a very lively time of it. Like all men of his time and class, he robbed and murdered, and then sought conciliation and forgiveness by erecting and endowing monastic establishments and churches. In 1186, when he had completed the church at Downpatrick, he had the remains of Saints Columba and Brigid translated to it under the auspices of Cardinal Vivian, who had come from Rome to witness the ceremony. It is said that the translation was purely a political move of De Courcy's, more so than a pious act, as he wished to impress the conquered people by his piety and benevolence. It is easy to understand how venerated must have been the spot that contained the relics of three such illustrious saints, but all the veneration and love did not prevent contending forces from destroying De Courcy's church. De Courcy married the Lady Affrica, daughter of Godfred the King of Man; and she appears to have been equally energetic in religious works, as she founded Grey Abbey, not far off from Downpatrick, and placed a contingent of Cistercian monks in it from Holm in Cumberland; it bears the curious dedication "To St. Mary and the Yoke of God." This abbey is the most important relic of a monastic establishment in the county. The Lady Affrica, or her husband, also founded the Cistercian Abbey of Inch, close to Downpatrick; but very little now remains of it, except its chancel, which contains a group of three tall lancet windows. But all these material and saintly precautions did not save Sir John—he was arrested by Hugh De Lacy, and on the order of King John, imprisoned in the Tower of London; and although liberated after some time, he seems to have had enough of Ireland, and to have kept away from it.

As now restored, the church has become the Cathedral of the Diocese of Down; but on plan it only represents the sanctuary of the old church with a modern square tower, and the transepts and nave tacked on to it, while every vestige of the monastic buildings has long since disappeared. The unusually large size of the chancel indicates a church of great dimensions; it must certainly have been the largest church in Ulster; even now it is large and heavy-looking and, from an architectural point of view, not very interesting; but the old foliated capitals of the rather curiously-formed pillars are good and refined pieces of sculpture; these, during some recent improvements, have received a good coat or two of distemper, which is a splendid method of preserving beautiful examples of carved work.

Downpatrick also possessed the following, none of which now remain:—

1.—"The Priory of St. John Baptist, belonging to the Crutched Friars, under the rule of St. Augustine, and founded by De Courcy."

2.—A Priory of Regular Canons, said to have been founded in 1183 by Malachy O'Morgair. It was near the Cathedral.

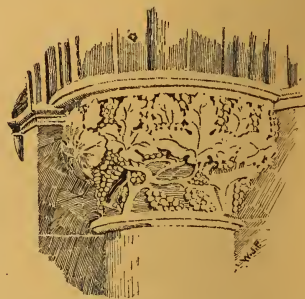
3.—The Priory of St. Thomas the Martyr, otherwise Toberglorie (*i.e.*, Pure Well) or Regular Canons.

4.—Franciscan Priory founded about 1240 by Hugh De Lacy.

5.—Nunnery of the Blessed Mary.\*

The battle flags of the British regiments connected with the county have been hung in this church, and it also contains a monument to one of the Cromwell family.

In the immediate neighbourhood of Downpatrick the antiquary will find much to interest him. He will see many an old castle built by the Normans to protect their stolen property. Not the least interesting is one at Dundrum, about seven miles distant from Downpatrick, but built for the Knights Templars by De Courcy, who was himself a Templar. This castle has a circular donjon keep sur-



rounded by extensive outworks; it had a turbulent existence until Oliver Cromwell put an end to it in 1652. He will see the ancient church of Raholp, dating from the sixth century, and near it at Struell a cluster of holy wells, formerly resorted to by thousands of the afflicted seeking relief, but now only visited by an occasional tourist. He will also see the remains of an old Cistercian abbey at Inch, which is in sight of the great Dun already mentioned; and from the Stone Age he will find many a rath, and here and there a stone circle, and many a souterrain, those curious stone-built underground places of refuge, with their cunningly contrived barriers as additional protective measures, all completing a connection of habitations of man during the different periods of his occupation.

[We are indebted to Messrs. W. and G. Baird, of Belfast, for the illustrations used in this article.]

#### "BUILDING DETAILS."

We have just received from Mr. Frank M. Snyder, architect, New York, who is himself directly issuing the publication, a copy of the first part of a new serial work, entitled "Building Details." The first part consists of ten sheets of details, from the architects' working drawings, and which have been verified by comparison with the actual work as executed. The details include examples by such well-known men as Messrs. McKim, Mead, and White, Boring and Tilton, and other prominent New York architects.

Part one, before us, is entirely devoted to the illustration of sash window details from actual examples, and well illustrates the very complete and minute fashion in which such working drawings are prepared in the States. The joinery work shown does not materially differ from ours, but is far more elaborate and expensive; whether these types of window are more effective and weather-tight we cannot say, but we presume that our practical and thorough-going cousins would not elaborate them to so great an extent were the results not commensurate. They are one and all most suggestive, especially to students, showing the work in the most complete detail. Although, as we have mentioned, the details are exceedingly good, and from examples by the best men in the States, and are intended for such prominent positions as, for example, the dining-room of the University Club, New York, yet we look in vain for those little touches of individualism and artistic life in the character of the mouldings, such as one sees daily in the work of all the better London men. The profiles are extremely commonplace, such as those we are accustomed to see in the houses of the "Early Victorian" era in Ireland, and still used in stock pattern doors, etc., and by tradesmen; but by architects of taste never. In this respect at least England, and even Ireland, however much they may lag behind in scientific attainments in engineering or architecture, have little to learn from America.

# THE DEVELOPMENT OF DOMESTIC ARCHITECTURE IN ENGLAND.\*

From the 12th to the 18th Century.

By MR. J. A. GORCH, F.R.I.B.A.

The subject is large—so large that one-half of it has filled the four portly volumes of Messrs. Turner and Parker on the "Domestic Architecture of the Middle Ages," and as that work would take, on a moderate computation, four and twenty hours to read aloud to you, without any interval for rest or refreshment, it is quite obvious that the view which we take this evening of the subject must be cursory and confined to but a small part of the whole range of research.

In dealing with so large a subject, it will be impossible to enter into minute details of style, decoration, and fittings; but it may be of interest to show by means of plans and views how the stately homes of England grew from their small beginnings, and what were the most important influences which affected their disposition and their appearance. We are accustomed to take the memorable houses of the country very much for granted, each one being characteristic of its own period. What I want to do is to show, if only by glimpses, how these great houses grew, and what relation they bear one to another.

In the present day we should classify the accommodation of a house in the three main divisions—the reception-rooms, the bedrooms, and the kitchens or servants' quarters. Going back to the times of the early Georges, the same classification holds good, but the bedrooms were less important, and the reception-rooms much more so. Still further back, in Elizabeth's days, the same division is applicable, but we find the chief apartment among the reception-rooms to be the great hall. The bedrooms were largely left to take care of themselves. In all three periods the kitchen department is fairly commodious; but if we go back to the thirteenth or, further, to the twelfth century, the bedrooms practically disappear, and only the reception-rooms and the kitchens remain. Indeed, when we reach these primitive times it becomes necessary to alter our classification somewhat. There are still three kinds of rooms, but they consist of hall, solar and kitchens, the solar being the private apartment of the master, or, to use a more appropriate word, the lord. These three rooms are the nucleus from which grew the vast mansions of Elizabeth and Anne, and the development of domestic architecture consists largely of the development of this one single apartment for the lord into the separate apartments which are now provided for each of his household.

There is this initial difficulty in investigating the houses of the early middle ages—that most of them have disappeared. They were, as a rule, built of wood and plaster, only some of the more important being of durable materials. Those which have survived have suffered so many alterations in the course of their existence that their original arrangements are not always to be made out. Nevertheless, from such remains as survive, and from the rare references to such matters as have come down to us in contemporary writings, it is quite clear that houses consisted of, first and foremost, a hall; then at one end the solar or *sollere* (as it is also called), and at the other the kitchen, with its subsidiary apartments. Writing about the year 1180, one Neeham, who rose from being the master of the Grammar School at St. Albans to being Abbot of Cirencester, enumerates the apartments of a house as consisting of the hall, a private or bed-chamber, the kitchen, larder, servery, and cellar.

The houses of that time were comparatively limited in number. They were the King's houses, of which he had a good many in different parts of the country; the houses of the great barons, and the manor-houses. Besides these, there were the great religious establishments, which, however, had their own special arrangements, hardly falling within the scope of this paper.

Many of the great barons lived in highly fortified houses, which we call castles, some of which were actually military strongholds. In the case of others it is not easy to draw a distinct line between the castle and the house, for they were all more or less fortified. But at present it is not the military strongholds which are under consideration, but those dwellings which were only fortified in order to secure their inhabitants. Such a house was the Peak Castle in Derbyshire, which was built on a steep hillside on a triangular piece of land, protected on one side by one of the numerous and precipitous dales for which Derbyshire is famous, on a second side by the sheer descent of the gorge into which the Peak cavern opens, and

on the third by the steep hillside, at the top of which was the outer wall of the castle. The dwelling part of the castle was the keep or tower, the ruins of which still crown the summit of the isolated piece of land. This keep resembles the pele towers of the Scottish Border, many of which still remain both in Northumberland and in the Lowlands of Scotland. It is a square tower of three or four storeys, each floor containing one room. The basement was a cellar. The floor above it contained the hall. Over the hall was the lord's private apartment. This arrangement is very primitive, and represents what must have been the minimum in the way of accommodation which was tolerated. This vertical disposition of rooms, one over the other, soon gave way to a disposition which placed most of them on the ground floor, or, if they were not on the ground floor, they were spread out into a form less rigidly vertical.

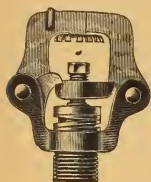
Whatever arrangement was adopted, however, the hall was the chief apartment. It was the largest, the most permanent, and the most central. It was, in fact, the dwelling-place of the household, and became synonymous with the house itself, which was in most parishes known as "The Hall." In this apartment the whole household lived, ate, and slept, all save the lord, and possibly his family, who had a separate room into which they could retire, already mentioned as the solar. The solar appears to have been almost always an upper chamber, built over an apartment which was often used as a store-place; but there are so few remains of these very early houses that the exact arrangements can hardly be made out with certainty. The solar seems to have been approached in many cases by an outside staircase. But, at any rate, this much is clear: that the hall stood in the middle between the solar and the kitchen, the latter being the third of the three main classes of rooms which these early houses contained. The cooking was not done in the hall, but in a separate building devoted to the purpose, attached to which were a few subsidiary rooms, such as the larder, where the food was kept; the servery, where provisions, linen, and table-furniture were stored; the cellar, which was used for general stores and wine; and the buttery, where the drink was distributed. These smaller rooms were not always provided. Their presence depended on the importance and size of the house; but there were always and in every house the three divisions of hall, solar, and kitchen, the hall lying between the other two. The arrangement of the hall was simple, and remained the same in principle from the earliest times down to the seventeenth century. It then underwent a change which marked a complete revolution in domestic architecture, and which will be described in due course.

## Oakham.

The hall, lying as already said, between the solar at the upper end and the kitchen at the lower, was entered, close to the latter, by a door in its side wall. Through the lower end wall were doors leading to the kitchen department, sometimes two, sometimes three. Of these, one opened into the buttery, one into the kitchen or kitchen passage, and the third (if there were a third) into the pantry. There was usually a screen stretching across the hall to keep off the draught from the open door, and more particularly to screen off the kitchen traffic, for draughts would still come through the windows, which were seldom glazed in early times. There were doors (generally two) through the screen into the hall itself, and there was a ceiling to the passage, cut off by the screen, which formed a gallery, usually known as the minstrel's gallery, although it is tolerably certain that very few of the ordinary households could have supported a private band. At the end of the hall, away from the screen, was the dais, which was a raised platform some few inches high, whereon the lord and his family and principal guests sat to dine. In this upper end of the hall was a doorway leading more or less directly into the solar. Both the solar and the kitchens were sometimes built of wood, as were also many of the subsidiary apartments. Such fragile buildings have disappeared, leaving in some cases little besides the hall to tell of the former extent of the house. This may have been the case at Oakham Castle, where the hall alone remains of the building erected about the year 1180 by Walkelin de Ferrers. But this hall is an extremely fine example of its kind. It is of considerable width, and the roof is carried in three spans—one over a central nave, and the other two in the shape of a lean-to against it, an arrangement similar to that adopted in churches, and serving to remind us of the similarity of treatment adopted in both ecclesiastical and domestic buildings. The windows are small and low down, and they have, in common with the doorway, the characteristics that distinguish the transition from Norman to early English.

\* A paper read before the Architectural Association of Ireland.





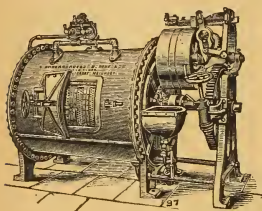
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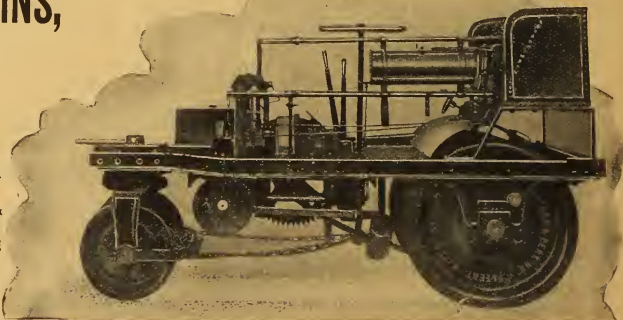
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# Oakham Interior.

The interior might well be taken for that of a church, with nave and aisles, but the position of the doorways in the end walls, the treatment of the windows on the inside, as well as the absence of any indication of a chancel, would put the wary enquirer on his guard—the hall-stands alone, the solar, and kitchens, which must have existed, having disappeared. It may be that they were burnt, for accidents of that kind happened not infrequently. One, indeed, happened in 1182, two years after this hall at Oakham was built, to no less a person than Abbot Samson, of Bury St. Edmunds, who (we are told) was nearly burnt to death in his solar, the only door being locked, and his early English windows being too narrow to admit of his getting through them.

If not burnt down, these rooms may have been blown down, as were the royal kitchens at Oxford in the seventeenth year of Henry III.

It seems quite clear from these and other specific references that many of the subsidiary rooms were built of wood, although the hall was of more durable materials. Its permanent character arose from the nature of its use. It was the sheltering place of the whole household. Temporary kitchens might be, and sometimes actually were, erected, so might a temporary bedroom. But in the hall the family and its retainers ate and slept. In it also the lord held his courts, and received those who came to see him on matters of pleasure, of business, or of strife.

Personal comfort was not much studied in those days. Men were content to sleep where they could, and when there was no room in the hall they sought without reluctance the equally refined shelter of the stable. There was no indignity put upon Ivanhoe in sending him to the stable. His fellow-knights often shared his fate in this respect. A little after his time we learn that Henry III. ordered the wood cellar at Clarendon to be fitted up as a chamber for the knights in attendance on him. As they were not particular about their beds, so also they had simpler views than we have about the heating of their rooms. In some houses only the solar had a fireplace. The hall was heated by fire in its midst, the smoke finding its way out of a louvre on the roof. Here and there the hall had a fireplace of its own. The smoke from the central fire found other vents than the louvre, for but few of the windows were glazed. Wooden shutters served to keep out the weather. In some grand houses the part above the transome was glazed, while that below retained its shutters. But people were susceptible to draughts even in those hardy days, for Henry III. directed a window in the Queen's room in the Tower to be glazed, "so that the chamber might not be so windy."

It was in his reign, too, that the practice of wainscoting rooms—that is, lining the walls or the roof with wood—was introduced, and there are several instances in which he ordered a certain number of bays of a roof to be wainscoted, presumably in order to keep the draught from his own head and those of his principal guests.

But I must not enter too much into details. These matters have been mentioned rather with the view of showing how small an amount of what we call comfort was expected in those days, and how, therefore, it is not surprising that very few rooms satisfied the domestic needs of the times.

# Stokesay.

At Stokesay, which was built in the thirteenth century, the main dispositions conform to the usual type. There is the large hall entered at the end of one of its sides. At its upper end is a door which eventually gave access to an outside staircase leading to the solar. At its lower end is a cellar, over which is an apartment with a fireplace. This room was reached by a staircase in the hall, standing in what would ordinarily be the screens. Of the kitchen there does not appear to be any remains. Beyond the upper end of the hall is a tower, which was used for defensive purposes, upon the particulars of which it is not now needful to dwell. The details of the work are characteristic of the 13th century. The hall windows are of two pointed lights surmounted by a circle. The lights, which are divided horizontally by a transome, were provided with shutters; but the circle was apparently always open for the winds of heaven to blow through, and doubtless it was through them that most of the smoke from the central hearth escaped.

# Yanwath.

Yanwath or Yanwith Hall, in Westmoreland, was built early in the fourteenth century, but underwent considerable alterations in the sixteenth. The same arrangement was adopted here as in the former examples. The great hall was approached through a passage, which was enclosed by a stone wall on both sides, instead of having one side

formed by the wood screen of the hall. On the left of the passage was the kitchen; on the right was the hall. The hall itself had a fireplace instead of a central hearth, and this fireplace was at the lower end of the hall. In later times it was more usually placed near the lord's end. There is also a bay window, a feature which became subsequently of universal adoption. The solar in this instance is developed into several rooms, situated in a tower, and exhibiting the usual characteristics of the accommodation of a pele tower—namely, one fair-sized room on each floor, surrounded by thick walls, in which are contrived various diminutive apartments, access being obtained from floor to floor by means of a narrow newel staircase.

In addition to the usual accommodation which has hitherto been mentioned, Yanwath had a number of other rooms arranged so as to form an enclosed courtyard, one side of which has, however, disappeared. The entrance to this courtyard was through a gateway nearly opposite to the hall door. This courtyard idea, which arose from the necessity for defence, lingered on, as we shall see, for reasons of appearance, long after the need for defence had ceased.

(To be continued.)

# ENGINEERING NEWS.

**Ballycastle.**—The Ballycastle (Co. Antrim) Rural District Council have decided to proceed with a water and sewerage scheme for Cushendall at an estimated cost of £2,914. The Local Government Board threatened that if the Council neglected to form a scheme that a mandamus would be sought for at the King's Bench.

**Blackrock.**—A deputation of the Joint Drainage Board for Kingstown and Blackrock waited last week on the Local Government Board for the purpose of obtaining their sanction to the expenditure of a sum of £4,000 to remedy the defects in the sewage pumping station at Blackrock. The Drainage Board propose to substitute the "Shone Ejector System" for the hydraulic pump now in use at a cost of £4,000, to be repayable in a period of not less than five years. Sir Henry Robinson, Vice-President of the Local Government Board, expressed his sympathy with the Blackrock Council in its difficult position. As to extending the repayments of the loan over a period of five years he saw no reason to object under the circumstances, as it was a necessary and urgent work. It might be considered under the heading of maintenance and upkeep, as it only meant substituting one set of pumps for another.

**Castleblayney.**—A new sewerage and waterworks scheme for Castleblayney is about to be undertaken by the Castleblayney Urban Council, according to plans prepared by Mr. Francis Bergin, B.E., 36 Westmoreland-street, Dublin, and tenders are invited. The work consists in the construction of storage reservoir, filters, and clear water tanks, the providing and laying of cast-iron pipes, the providing and fixing of fountains, manholes, septic tanks, and bacterial filters. Tenders close December 17th.

**Carlow.**—The Board of Guardians for the Carlow Union invite tenders for the supplying and fixing complete, with all fittings and mountings, a vertical boiler for cooking, laundry, and heating capable of evaporating 1,100 lbs. of water per hour, according to the specification of Mr. James O'Donnell, A.M.Inst.C.E. Tenders close 10 a.m., 22nd November.

**Co. Down.**—The Newtownards Urban District Council invite tenders up to 10th December for the construction of a complete system of waterworks for Newtownards. The work will consist in driving a tunnel 1,500 yards in length, the construction of a concrete reservoir of 2,000,000 gallon capacity, and another of 1,000,000 gallon capacity, the laying of an aqueduct, and the laying of about 16,800 yards of cast-iron pipes of 10-in. to 3-in. diameter throughout the town, with the supplying and fixing of all pipes, valves, meters, hydrants, specials, etc., and the providing and fixing of pumping engines with all necessary fittings. The plans and specifications are by Messrs. Swiney and Croasdaile, M.M.Inst.C.E., Avenue Chambers, Belfast.

**Donegal.**—Mr. John McCarry, assistant surveyor, has written to the County Council stating his intention to resign, and asking to be relieved of his responsibilities. The resignation was accepted, and it was decided to advertise for a successor.

**Derrygonnelly (Co. Fermanagh).**—At the meeting of the Enniskillen Rural District Council, Mr. Thomas Elliott, C.E., Enniskillen, wrote, stating that after making a careful survey and taking levels, etc., he found it possible to construct the septic tank and filter in a field of Mr. John



M'Brien, where there would be a plot of ground to receive the effluent, but this would necessitate an extension of the main sewer by 370 yards at an estimated additional cost of £247, which included the enclosing of the ground with a wire fence. It was decided to forward Mr. Elliott's communication, together with the altered plans and specifications accompanying it, to the Local Government Board for their opinion in the matter.

**Enniskerry.**—The Rathdown Rural District Council invite tenders for the main drainage and sewage disposal works of Enniskerry. The drainage is to be a pipe system, and the disposal works consist of septic tanks, contact beds, and ultimate purification, the effluent being discharged into the river. The engineers are Messrs. Ryan and Butler, Dawson-street, Dublin. Tenders must be delivered at the Board-room, Loughlinstown, on or before 28th inst.

**Greystones.**—Portion of the La Touche estate is about to be developed for building sites in Rathdown Lower. New roads and sewers are proposed, and tenders will shortly be invited, subject to the consent of the Court of Chancery, from the plans and specification of the estate architects, Messrs. Doolin, Butler, and Donnelly, Dublin.

**New Ross.**—The Urban District Council invite tenders for the construction of the necessary works for the supply of water for the town of New Ross and County of Wexford. Particulars of the work are given in our advertising column. Mr. Francis Bergin, 36 Westmoreland-street, Dublin, is the engineer.

**Portstewart.**—The Committee of the Rural Council have called in Messrs. Swiney and Croasdale, M.M.Inst.C.E., of Belfast, to advise and report upon the scheme proposed for improving the supply of water to Portstewart.

**Sligo.**—At the meeting of Sligo Harbour Commissioners, a letter was read from the Under-Secretary, Dublin Castle, stating that the Lord Lieutenant had caused an estimate to be made of the cost of the works which it would be desirable to have executed for the improvement of the harbour, from which it appeared that £10,000 would be required for the outer harbour works, £1,500 to provide better anchorage at Pool Bay, and £15,000 for the inner harbour works. His Excellency was prepared to recommend the Treasury to make a free grant in respect of harbour improvement works, but before doing so he should be in a position to state the amounts which the Harbour Board, County Council, and Town Council of Sligo will contribute towards the expenditure. The Board considered the letter satisfactory, and deferred the consideration of it to a special meeting.

**Tuam.**—At a special meeting of the Committee, held in the Town Hall, it was resolved:—"That we, the Water-works Committee, request the District Council to apply for an arbitrator under the Provisional Order, 1906, in connection with proposed improvement works at Birmingham." Dr. Higgins called attention to the proposed sewerage in connection with St. Jarlath's College, which the committee had approved of. He said if the sewerage was not carried out the College would be flooded. The Superintendent was directed to write to the District Council asking them to have the work carried out as soon as possible.

The Directors of the Strabane and Letterkenny Railway advertise for Tenders for the construction of Passenger and Goods Stations along their Line. Tenders close on the 3rd prox.

**Dublin.**—A new gymnasium is about to be erected for the Royal Hibernian Military School, according to the plans of Mr. J. E. Mellon, Chief Surveyor to the Board of Public Works. Quantities have been taken out by Messrs. Beckett and Metcalfe, Leinster-street, Dublin.

**Ennagh.**—The ceremony of laying the memorial stone of the new Presbyterian Church, Ennagh, took place on the 23rd ult. The work is being carried out by Messrs. Whelan Bros., Dublin, from the designs of Mr. H. J. Lundy, M.R.I.A.I., Dame Street, Dublin. The superstructure is built with Athy bricks, terra-cotta dressings, manufactured by Messrs. Beckett, Kingscourt, and the exterior will be pebble dash, which promises to give a very pleasing effect. Dr. M'Kean has kindly volunteered to provide the lead light windows, which are being manufactured by Messrs. M'Cullagh and Nairn, Stephen's Green, Dublin.

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**CONTRACT.****THE NEW ROSS URBAN DISTRICT COUNCIL.****NEW ROSS WATER SUPPLY.**

The New Ross Urban District Council hereby invite Tenders for the construction of the necessary works for the supply of water for the town of New Ross and County of Wexford, including a Reservoir in the townlands of Dranagh and Ballinalour, Electoral Division of Glynn and County of Carlow, and a Storage Reservoir at Ballyleigh, in the Electoral Division of Ballyanne and said County of Wexford.

A Specification, Bill of Quantities and Form of Tender, with Maps and Plans of said proposed works, have been prepared by Francis Bergin, Esq., 36 Westmoreland Street, Dublin, the Engineer appointed by said Urban District Council to carry out said works, giving in detail the nature of the proposed works; copies of such Specification, Bill of Quantities, and Form of Tender, Maps and Plans, have been deposited with the Clerk of the said Urban District Council, at the Office of the Clerk of the said Urban District Council at the Tholsel, New Ross. The Maps and Plans can be inspected at said Office during office hours, and a printed copy of said Specification, Bill of Quantities, and Form of Tender will be given to any Contractor applying for same on payment to the said Clerk of a sum of £3 3s. od. for each set, which will be refunded on receipt of a bona fide tender, and the return of all documents furnished by the Urban District Council.

Copies of the Plans, Specifications, and Bill of Quantities may also be inspected at the Office of the Engineer at 36 Westmoreland Street, Dublin.

The Tenders, which will be deemed only provisional in the first instance, should be deposited with the Clerk of the said Urban District Council, in sealed envelopes, endorsed "Tender for New Ross Waterworks," not later than 7.30 p.m. o'clock on Wednesday, the 12th day of December, 1906.

Each contractor furnishing Tenders shall, along with such Tenders, furnish the names and addresses of two solvent sureties (to be approved of by said Urban District Council) who will join the contractor in a bond for the due execution of the works.

The said Urban District Council will not bind themselves to accept the lowest or any Tender, and will not in any event finally accept the Tender of any contractor until a loan, which has been applied for and in respect of which a Loan Inquiry has been held, shall be sanctioned.

The contractors shall provide that all materials used in the carrying out of the works shall be of Irish make, unless the Engineer of the said Urban District Council, having charge of the works, shall be of opinion and shall so satisfy the Council that such materials cannot be procured in Ireland.

The contract to be entered into for the carrying out of the works shall contain stringent conditions binding the contractor or contractors to carry out the above conditions.

Dated this 30th day of October, 1906.

M. J. FINN, Clerk of the said Urban District Council.

COLFER AND GETHIN, Solicitors for said Urban District Council, New Ross.

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**CONTRACT.****NOTICE TO ARCHITECTS.****LOCAL GOVERNMENT BOARD FOR IRELAND.****LABOURERS (IRELAND) ACTS, 1883 to 1906.**

The Local Government Board for Ireland invite the submission of designs suitable for the erection of Labourers' Cottages in Rural Districts throughout Ireland under the above Acts, and are prepared to award premiums of £50, £30, and £20 for the three best designs.

A copy of the conditions of the competition, and instructions to competitors, can be obtained on application, by letter, to the Secretary of the Local Government Board, Dublin, to whom designs are to be sent not later than 3 o'clock p.m. on the 31st December, 1906.

A. R. BARLAS, Secretary.

Local Government Board,  
Dublin, 14th November, 1906.

**STRABANE AND LETTERKENNY RAILWAY.**

The Directors of the above Railway are prepared to receive Tenders for the construction of Passenger and Goods Stations along this Line.

The Drawings, Specifications, and Measurers' Quantities may be seen at the Office of their Engineer, Mr. James Barton, Exchange Buildings, Dundalk.

Tenders must be sent upon the form which will be supplied to intending Contractors, and must be with the Secretary of the Company, Mr. J. Gillespie, Londonderry, on or before the 3rd of December next.

(By Order),

JAMES BARTON,  
Engineer.

November 14th, 1906.

**RATHDOWN (No. 2) RURAL DISTRICT COUNCIL.****WORKS OF SEWERAGE AND SEWAGE DISPOSAL AT ENNISKERRY, CO. WICKLOW.**

The Rathdown (No. 2) Rural District Council will, at their meeting on WEDNESDAY, the 28th NOVEMBER, 1906, be prepared to receive and consider Tenders for the Sewerage Works at Enniskerry, Co. Wicklow, and other works connected therewith, in accordance with the Plans, Specifications, etc., prepared by the Engineers, Mr. J. H. Ryan, M.Inst.C.E., and Mr. R. M. Butler, A.M., Inst. C.E.I.

Conditions, Specification, and Quantities can be inspected and Forms of Tender obtained at the Engineer's Office, 22 Nassau Street, or at the Clerk's Office, Loughlinstown, on all week-days between the hours of 11 o'clock a.m. and 3 o'clock p.m.

Sealed Tenders upon the Form supplied (and none other will be entertained) to be sent in, and addressed to the Chairman of the Council, not later than 10 o'clock on the morning of the 28th November, 1906, and endorsed "Tender for Enniskerry Main Drainage."

The Council do not bind themselves to accept the lowest or any tender, and local labour must be employed as far as possible.

By Order,

PATRICK CUNNIAM,  
Clerk of the Council.

Clerk's Office, Loughlinstown,  
14th November, 1906.



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No. 24—Vol. XLVIII.

HEAD OFFICE

DECEMBER 1, 1906.

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## TOPICAL TOUCHES.

In this issue we publish a special description of the Donegal granite quarries and of the work lately done there.

\* \* \* \* \*

The Jesuit Fathers contemplate building an addition to their house at Miltown Park at an early date. The probable outlay will be £6,000 to £7,000.

\* \* \* \* \*

The Rathdown Rural District Council advertise for tenders for 63 labourers' cottages in the No. 1 District, and are promoting a further scheme of over 100 cottages in the No. 1, and 42 cottages in the No. 2 District.

\* \* \* \* \*

In this issue we publish Mr. J. A. Gotch's lecture, delivered before the Architectural Association of Ireland a couple of weeks ago, together with a couple of illustrations. It is scarcely necessary to emphasise Mr. Gotch's acknowledged eminence as an authority on the period dealt with.

\* \* \* \* \*

The views we select for reproduction include Kirby Hall. Kirby was visited by the English Architectural Association in August last, and is quite one of John Thorp's most notable creations, and dates from 1570-75. It is an early example of an attempt at symmetrical planning, but is now, unfortunately, in a sad state of decay. The south side is the best preserved, and is very interesting. The centre porch has two charming little ceilings by Inigo Jones, who is also credited with the woodwork in the hall.

\* \* \* \* \*

Messrs. Brooks, Thomas and Co., of Sackville Place, Dublin, are now discharging a large cargo of blue Bangor slates from Lord Penrhyn's quarries. The sizes include 24 in. to 36 in. Queen's Tons, 24 in. x 14 in., 24 in. x 12 in., 20 in. by 12 in., 16 in. x 8 in., and 14 in. x 12 in., as well as other sizes.

\* \* \* \* \*

The organ of the old London City church of St. Mary Aldermay, an instrument dating back for two centuries and a-half, has just been restored at a cost of £1,200.

\* \* \* \* \*

A certain amount of speculative building still continues around Dublin, and there is no wild tendency to over-build, with the result that comparatively few of the new houses are left vacant on their owners' hands; in fact, there is not much difficulty in selling a well-planned, compact, and substantial house of a certain class. On the other hand, not for generations has it been so hard to sell even solidly-built and well-preserved old houses, the property market being at a very low ebb and money very tight. The extraordinary increase in the Bank rate has, of course, greatly hindered building enterprise, and no building contracts of any importance have recently been let.

The Pembroke Urban Council contemplate shortly promoting a large scheme of dwellings for the working classes.

\* \* \* \* \*

Over 500 cottages are being built or promoted in the Dunshaughlin, Navan, and Balrothery Districts, Counties Dublin and Meath.

\* \* \* \* \*

At the last meeting of the Royal Institute of the Architects of Ireland, Mr. J. H. Webb was elected Hon. Secretary, and Mr. F. Hicks Hon. Treasurer, for the ensuing term.

\* \* \* \* \*

Following on Mr. W. J. Fennell's capital article on Downpatrick, which appeared in our last issue, we now reproduce a fine photograph of the Cathedral by Mr. Welch, Belfast.

The Cathedral still boasts some very interesting remains, as indicated. In our next issue we hope to publish an article by Mr. Fennell on Bangor, Co. Down.

\* \* \* \* \*

On Tuesday last Mr. St. John Lyburn, of the Department of Agriculture and Technical Education, delivered a lecture before the Architectural Association on "Irish Building Stones." Mr. Lyburn is one of the best and most practical authorities on the subject, and his extensive acquaintance with every quarter of Ireland enables him to speak with great confidence as to the real merits of the possibilities of the district.

\* \* \* \* \*

We have for a long time past heard little or nothing of the project of the Channel tunnel between England and France, but, in company with the development of aerial navigation, it has within the past few weeks been

greatly talked of. Hitherto the chief objection has been the military one, the engineering difficulties being regarded purely as a question of ways and means, and, indeed, it is difficult to see anything insuperable, granted unlimited resources; it is even more difficult to comprehend the military objections as very serious, the defence of the mouth of a tunnel being, to a civilian, at least, a comparatively easy problem to deal with.

\* \* \* \* \*

"The Builder" gives some particulars of a scheme mooted by the Société Française. The tunnel would be through a strata of clay, 60 metres in thickness, the position of which is well known. Two tunnels, five or six metres in diameter, would be bored parallel about 15 metres apart, and following the strata vertically. The work would occupy, at least, seven years, and be begun at both ends and at intermediate points. It would start near Calais, and end between Dover and Folkestone. The total length of track would be 56 kilometres, 37 of which would be below the Channel. The lowest point would be about mid-way 100 metres below sea-level, and about 45 metres below the sea-bed.



SIR ALFRED BRUMWELL THOMAS.  
Architect of the Belfast City Hall.  
(Who was recently knighted).



The Dublin Corporation have at last put the "Unemployed Act" in force.

\* \* \* \*

The South-west Tower of St. Paul's Cathedral, London, is reported to be 15 inches out of the perpendicular.

\* \* \* \*

It is rumoured that some hitch has occurred in reference to the Clontarf Main Drainage Works, for which a tender was recently accepted.

\* \* \* \*

An Electric Lighting Scheme is being promoted for Greystones, Co. Wicklow. It has been suggested to light the town by means of electricity generated by means of gas producer plant.

\* \* \* \*

On the 6th December, Mr. P. C. Cowan, Chief Engineering Inspector of the L.G.B., will hold an enquiry at the City Hall into the application of the Dublin Corporation for sanction to a loan amounting to £134,842 8s. 6d., and £9,000, for the purposes respectively of constructing the proposed new reservoir at Roundwood, and for completing the Brides' Alley Housing Scheme.

\* \* \* \*

There is, so far, but little news of improvement in the condition of the Irish building trade to record. Things are probably not quite so bad as at the close of last year, but, nevertheless, the present year draws to a close under distinctly melancholy conditions, with no very great prospects of improvement. Still we must hope for the best, and trust that 1907 may open with brighter prospects.

\* \* \* \*

The Local Government Board Auditor has surcharged three members of the Committee of Management of the Ennis District Lunatic Asylum in respect of a payment made to their architect, Mr. F. O'Connor, C.E., of Ennis, who prepared plans for a new sewerage scheme for the asylum some time since. It seems the ground of objection was, that Mr. O'Connor had been appointed at a certain scale of fees, should the work be carried out or not, and the payment in question, which was disallowed by the Auditor, was on the higher scale. The Committee now think the architect should refund them the sum disallowed. Mr. O'Connor, it is stated, has a further claim of £1,000 for fees in connection with a proposed enlargement of the asylum.

**Valentia.**—An effort is being made to build and equip a school in connection with the National Board of Education in the Island of Valentia, Co. Kerry.

As a further instance of the increasing value of native woods, we may mention that the demand for Scotch fir has not for many years been as great as at present. Scotch fir is not to be compared with larch for lasting and other properties, but it is still suitable for many purposes. Nevertheless, it has been for a long time a veritable drug on the market, the prices obtainable for it being ridiculously low, and the timber in most parts of Scotland having been for years almost unsaleable. The fact that it is rising steadily in value is significant of the prospects in store for native timber of every sort, and gives added strength to the demand for a scheme of reafforestation in these countries.

Particulars are given in the *Journal des Debats* respecting the arrangement recently concluded between the Russian Government and Mr. Jackson, an American engineer, as to the surveys for a canal between the Baltic and the Black Sea. The survey is to cost not more than 200,000 roubles (about £20,000) and if the concession for the canal is not ultimately given to Mr. Jackson, he is to be paid the cost of the survey up to that figure. He is also to employ, as far as possible, Russian engineers to assist him in the work. Should the canal be ever constructed it will be an enormous undertaking, the consequences of which will prove of vast political and commercial importance.



### ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

It is to be regretted that such a comparatively few members were present on Tuesday to listen to the paper on "Irish Building Stones," read by Mr. E. St. J. Lyburn, A.R.C.Sc.I. Such an interesting subject, treated by a well-known authority, might be expected to draw a large audience of architects, if not out of courtesy to the lecturer, at least out of a desire to learn something of the quarries of Ireland. It was encouraging to note, amongst the many excellent lantern views with which the paper was illustrated, that quarrying is now being carried on in a thoroughly business-like way, with the result, as Mr. Lyburn stated, that Irish building stones can now be supplied to meet practically all demands. The machinery that has been, or is in process of being, installed is of the most modern character, an example of the wire saw in use at Galway granite works being an evidence of this fact.

\* \* \* \*

The lecturer gave a very detailed description of the new sand-lime brickworks at Newry, where bricks are manufactured on an American principle, out of a mixture of 94 parts sand to 6 parts lime, thoroughly incorporated and subjected for ten hours to a steam pressure of 150 lbs. to the square inch. These bricks compare favourably in quality and price with other bricks on the market.

\* \* \* \*

The proposer of the vote of thanks, Mr. Allberry, and the seconder, Mr. Bradbury, and those who subsequently spoke, stated what encouragement such instances of progressiveness would have for architects to specify Irish materials, and Mr. Lyburn, and the Department of which he is an official, may feel confident that the excellent information which the lecture contained will have a substantial result. It is to be hoped that the Association will have many more similar lectures and more members to listen to them.

\* \* \* \*

The President, who is nothing if not thorough, in putting the vote, expressed his scorn of those architects who, wishing to utilise Irish materials, allowed their clients to override them, and of another speaker who, in relating his experiences of a visit to Valentia Slate Quarries, could think of nothing but of a remarkable fine echo which he heard there.

\* \* \* \*

On Friday next, the 30th inst., the first sessional meeting of the Design Club will be held at 5 p.m. at the A. A. rooms. It is to be hoped there will be a large attendance at the preliminary meeting to reward Mr. Dickenson's sustained efforts to render this Club a success.

\* \* \* \*

Mr. F. Batchelor, F.R.I.B.A., will read a paper on "Reinforced Concrete" at the rooms on Tuesday, December 11th, at 8 p.m. As he has had recent practical experience of this material, and the new method of construction, his remarks should prove valuable to both the student and the practising architect.

"WEE MACGREGOR."

## TOULOUSE AND THE MIDI.

## A SUMMER HOLIDAY.

By D. W. MORRIS, Surveyor.

[CONTINUED.]

**The Garonne.**

The railway crosses the Garonne, and the Canal du Midi, and traverses a most agreeable country, where the purple grapes shine out in the strong sun, and droves of fine geese are seen in every homestead, quantities of maize, clover, tobacco, potatoes; indeed, all sorts of country produce, and apples, pears, and figs are grown in abundance. Flights of thieving magpies are disturbed by the train; neither the Irish adage, nor the Scotch as to these gentry would apply here, as you see them in flocks stealing the good things of the fertile soil. Their depredations do not seem to be much minded, at least, we noticed no scare-crows; perhaps the French farmer is too aesthetic to put up such things. The geese, of course are being fattened for *foie gras* purposes; they seem of fine size, and splendid breed, and feathering.

At Muret, the first good town, Marshal Niel was born. Here there is a church of the XIV. century. A little farther on is a Renaissance castle, and at Boussets, where the Garonne becomes navigable, there are a XII. century castle, a fine modern Romanesque church, and the remains of a Roman villa.

**St. Gaudens.**

In and around St. Gaudens, a large and once very prosperous town, finely situated amid beautiful scenery, you find a Romanesque church of the XI. century, with a XV. century Gothic portal, the ruins of a XIII. century castle—the Chateau de Montespan—and an irrigation canal, forty miles long, for watering the vast plain which extends to the left. The line now follows the Garonne, skirting the mountains, and affording fine views.

We next reach Montrejeau, where we leave the main line, and go straight into the heart of the Pyrenees. There is a wonderful cave near here, the grotto of Gargas, with remarkable stalactites and stalagmites, and an arched roof more than 50 feet high. Here we met two trains, one going to and the other coming from Lourdes; both packed by pilgrims of all conditions, accompanied by nuns of all orders, and numerous priests. They had evidently come a distance, as the carriages belonged to the Paris-Lyons railway.

**Luchon.**

Our terminus for the present is Luchon, "La reine des Pyrénées." The scenery as we advance is truly magnificent. Great mountains, waterfalls, forests, rivers, sunlight and shade of all hues. At Luchon, you are in a beautiful valley, about 2,000 feet above the level of the sea, and the highest peaks of the Pyrenees towering above your heads, with their eternal glaciers shining brilliantly, and their snow-capped summits, on the other slope of which are Catalonia and Aragon, in Spain. Luchon is a fashionable health resort, where you have a multitude of hot sulphur springs of all varieties, a bath establishment of the first class for utilising them, and a Casino, where during the season you can hear the best music, singing, and acting, break yourself playing baccarat, or that gigantic fraud, *Petits chevaux*, dine in *Café Riche* style, and do many other things which the fashionable world thinks its duty. It is a great centre for mountaineering. An unfortunate accident occurred during our stay. A young gentleman, English on his father's side, who resided with his family here, and who knew the Pyrenees from his childhood, fell from one of the highest peaks, and was killed; indeed, the poor fellow's body had to be carried home in a sack, so mutilated was it. 'Tis a dangerous, but fascinating trade.

There are at present in our hotel a French gentleman and two ladies. with a guide from Chamonix, who has capped Mount Blanc twenty-six times. You have here as good riding horses as can be found, they remind one of Arab steeds; also, comfortable carriages, with two or four

horses, that travel, we can assure you, and are splendidly driven. Many of the excursions are done on horse or donkey back; as, after a distance of six or seven miles by carriage, the roads became impassable, unless for riding or walking. We could say much of the charm of these excursions, the grandeur of the scenery, and the benefit of living in the mountain air; but we must remember we are writing for a technical journal. Yet, the beauty of France, indeed, all natural beauty, has its origin in the sun; and it may be truly said that art has its also.

The Bath Establishment is a fine building, mainly of local white marble, with a colonnade of twenty-eight monolithic columns of St. Béat marble 14 feet high. The Casino is an elaborate structure of brick and cutstone, with a theatre, ball, reading, and billiard rooms, and every equipment for a pleasant life, situated in the midst of a beautiful garden, with a prospect from its front that would delight a savage. In these buildings, and in all the local work of France, there is one excellent feature, the materials are mainly derived from the locality, and are all made up, and manufactured, we may say, on the spot. We have been watching a villa being built, and it may be well if we say a few words about it. Nothing in it is foreign, or even from outside the district. The stone is of a flaggy nature, got in the locality, little mortar being used in the walls, which goes to make them warm and dry. A West of Ireland thatched cottage is never damp for this reason, that the walls are thick, and built dry in the centre; there is no such thing as solid hearting. The timber of this villa is from the mountains, brought down with great labour by bullocks, and cut up in a little sawmill driven by a glacier torrent. The slates, small and thin looking, come from the Pyrenees. The joinery, of oak, beech, or elm from the mountains is worked here in the cleverest fashion. The walls are finished with plaster. The arches are all rough stones untouched by tools. The eaves gutters, and downpipes are zinc, made on the spot. The outside is coloured agreeably, and with the aid of two kinds of plastering, corresponding to our dashing, and cementing, there is a good contrasting effect. This villa has a basement, an attic, and nine to ten rooms on the ground and first floors. It is erected quickly, and economically, and, although not pretentious, has a very satisfactory and comfortable appearance. What a lot could be done for building in Ireland, where it is so badly needed, if our abundant resources were utilised, if local materials were used, if little sawmills were set up, and worked by our splendid water supply, if Irish slates were used, if bricks were made plentifully, castings, locks, etc., and nothing imported, as is done here in the house we speak of. It is useless to say it cannot be done; let sceptics come to France, and see for themselves how easy it is.

Luchon is a foundation of the Celts; and, as the writer is half a pure West-Southern Irish Celt, he may claim to be still in his native country. The Romans came here about eighty years before Christ, mainly to use the waters. There have been numerous Roman remains discovered, marble altars, baths, etc.; indeed the present Bath Establishment is on the site of an ancient Roman one. Strabo wrote about Luchon, and must have often visited it. In fact, a great Roman city existed near here, of which something more anon. In the middle of the XVIII. century, by the enlightened direction of Megret d'Etigny, Governor of Gascony and Bearn, whose statue is here, much was done to develop the springs and discover new ones, and since then, by local enterprise, Luchon has been made a great and pleasant health resort. We should like to say a few words of the electric light installation, as we know so many Irish towns where a somewhat similar one might be at work. The motive power is water. About two miles out on the road to Bagnères de Bigorre a mountain stream has been dammed, and a small reservoir formed. From this, by tunnel and trench, an aqueduct has been carried along mid-height on



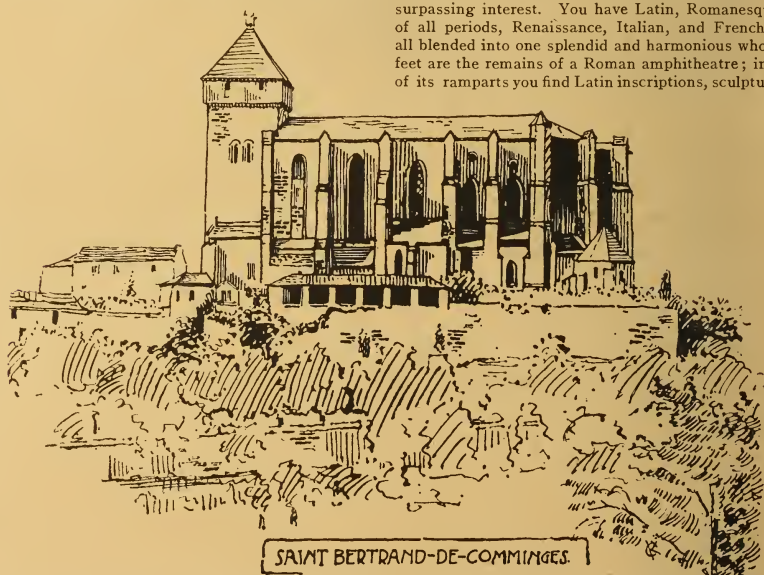
the hill to near Luchon, where a magnificent waterfall, 100 feet high, has been formed. A second reservoir is made here on the hillside, and through a 2-foot metal pipe the water is brought directly down to the power house, where there are turbines driving the dynamos. The outflow and waterfall go into the original stream, which is close at hand. The light is abundant, steady, and cheap. It is a clever and interesting piece of minor engineering; but, of course, at big or little things in engineering, the French lead creation, especially, from an aesthetic point of view.

Amongst the Luchon amusements lately, was a paper-chase on horseback; and, I am glad to say, in a hotly contested course by many nationalities, an Irish lady and gentleman won.

From here, as I have said, numberless excursions may be made, of the greatest interest to the architect, because of the Romanesque churches of the XI. and XII. centuries in the towns around and over the Spanish frontier, which is only an hour or so off. The marble quarries of St. B  at, fifteen miles off, may also be visited. They, and the surrounding country, give white, black, red, grey, and other marbles. Fine paving squares are made out of them. They

They are just what can be grasped by the bricklayer, who can lay with ease sufficient to compete with the thicker and ugly bricks used in Ireland.

About twenty miles from here by train, and near the junction Montrejeau, are St. Bertrand de Comminges, Valcabr  re, and the Church of St. Just. No visitor should miss seeing these wonderful relics of a great past. St. Bertrand was the capital city, with 60,000 inhabitants, of a great Roman colony, and was founded by Pompey seventy-two years before Christ. All round about is littered with Roman remains. In the churches you find beautiful acanthus-leaved ancient capitals in use as holy water fountains, and splendour they look. Here, indeed, are the remains of a great city of the highest culture, a great city disappeared, as it was razed to the ground by the Franks in the VI. century. Towards the end of the XI. century St. Bertrand was made Bishop, fixed his See here, and set about rebuilding it; and, after his canonisation, it took his name. Another Bertrand de Goth, its Bishop in the XIII. century, afterwards Pope Clement V., is mainly responsible for the cathedral. It is perched on a high rock above the surrounding country, enclosed by bold ramparts, and is a work of surpassing interest. You have Latin, Romanesque, Gothic of all periods, Renaissance, Italian, and French art here, all blended into one splendid and harmonious whole. At its feet are the remains of a Roman amphitheatre; in the walls of its ramparts you find Latin inscriptions, sculptured wolves



SAINT BERTRAND-DE-COMMINGES.

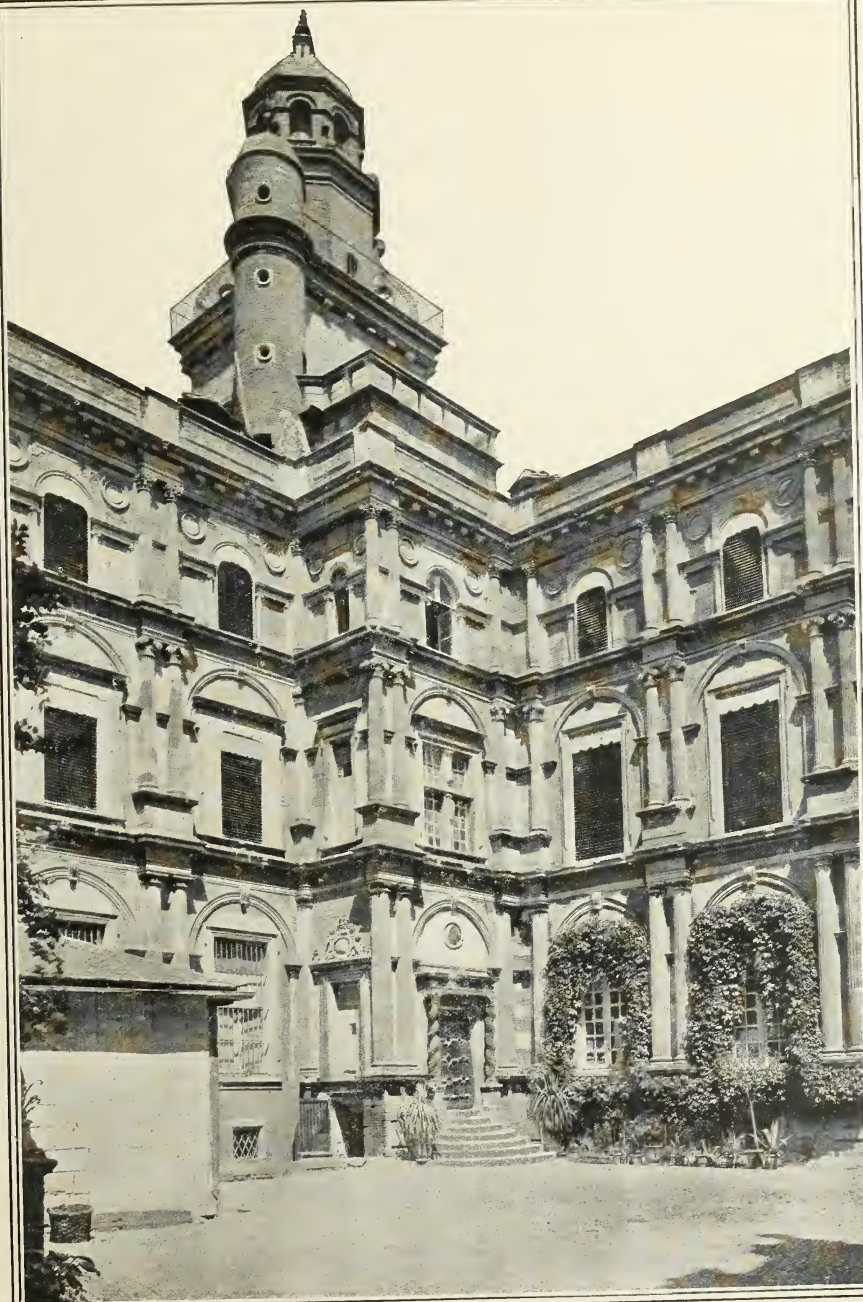
are all used, and are admirably fit for work of any sort that stone can be put to, and are a striking instance of nothing being left useless here. Agate and many beautiful stones are found in the Pyrenees, and are all turned to grand account by the small manufacturers of France. One of the purposes to which stone and marble are put here is baths, manhole and pit covers; they are much nicer and as effective as the ugly galvanised covers and imported iron baths we use. Very charming marble mantelpieces are also made in this vicinity. Why cannot we in Ireland do likewise? What fine chimneypieces we could have out of Irish quarries, designed by Irish architects, and made by Irish hands.

#### A Brickworks of the Midi.

An opportunity presented itself lately of visiting a brickworks. The clay is of excellent quality, burning a good, deep, natural red. The facing bricks are panelled both sides, and are first class. They are 22 centimetres long, 11 wide, and 5 thick. The proportions are excellent, as may be seen, and by avoiding headers, as before mentioned, and the clay burning a variety of reds, a very nice wall is got, the effect being much enhanced by the thin bricks, and the wide white, or coloured joints. These bricks are, in our opinion, of the right size for appearance and ease in laying.

without the twins, and a marble tablet on which is detailed the price of fish for the Lent of 1661, as settled by the Canons of the Chapter. President Roosevelt, instead of meddling with the spelling of the English language, about which it may be presumed he does not know much, might take a hint from the Chapter of this little French town in his mode of dealing with the American Trustees.

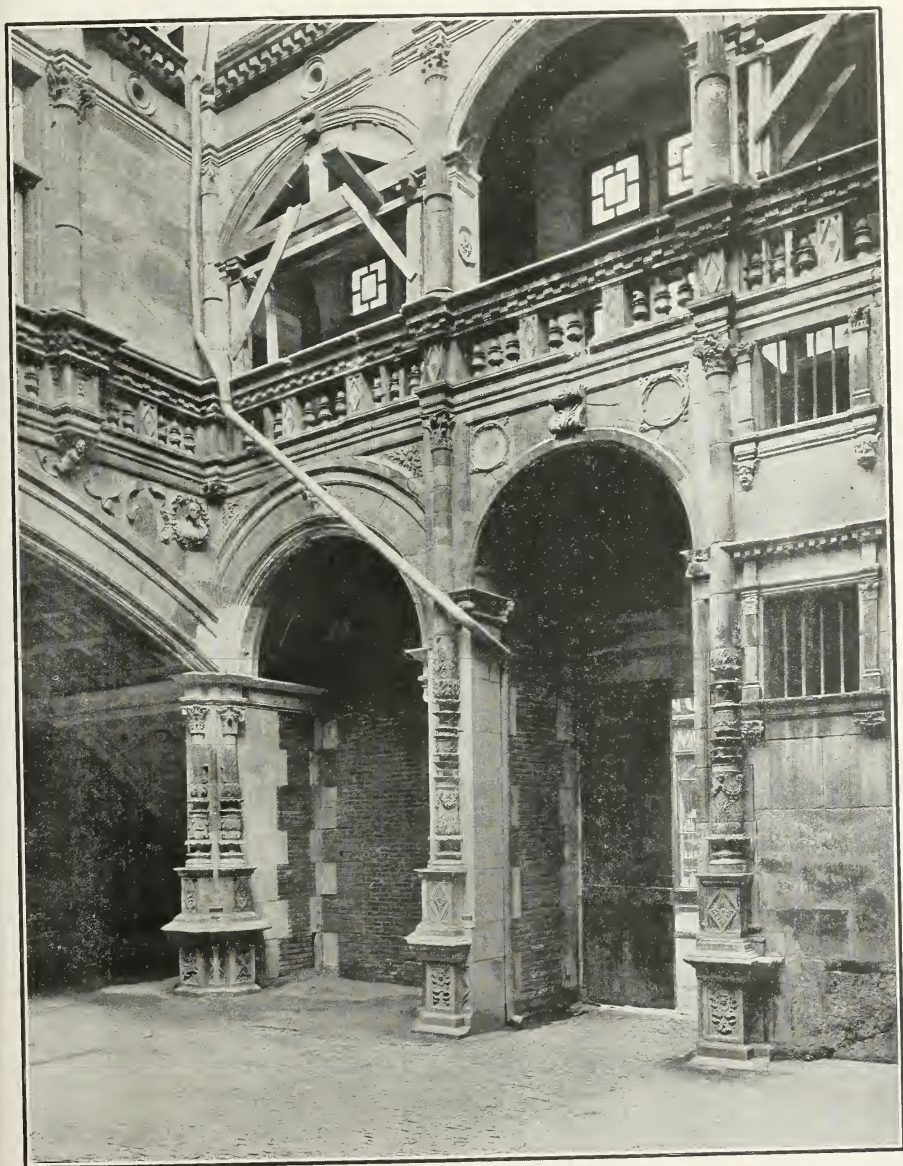
The Church of St. Bertrand dates from the XI. or XII. century, but in a large part from the XIV. It possesses in its rood, stalls, and organ enclosure the most beautiful wood carving of any church in the Midi. The rood, Bishop's throne, and stalls (66 in number) are in the finest Italian Renaissance, and the organ case in the most beautiful French of the same style. It is useless attempting to describe this carving. You have endless variety, wonderful invention and design, and superlative craftsmanship, all combining to produce a work which may be described as unique outside Italy. In the figures you have pagan gods and goddesses, prophets of the old law, saints, seers, and sinners of the new; and, standing out in this labyrinth of art, you have the genealogical tree of the Saviour, springing from the breast of Jesse, with the twenty-seven Kings of Juda in its branches, finishing with a flower from which rise triumphant the infant Christ and his Virgin mother. Here you have ancient tombs of great crusaders, the cope,



HÔTEL D'ASSÉZAT, TOULOUSE.







**HÔTEL BERNUY, TOULOUSE.**







*Photo.]*

**DOWNPATRICK CATHEDRAL.**

*[R. Welch.*



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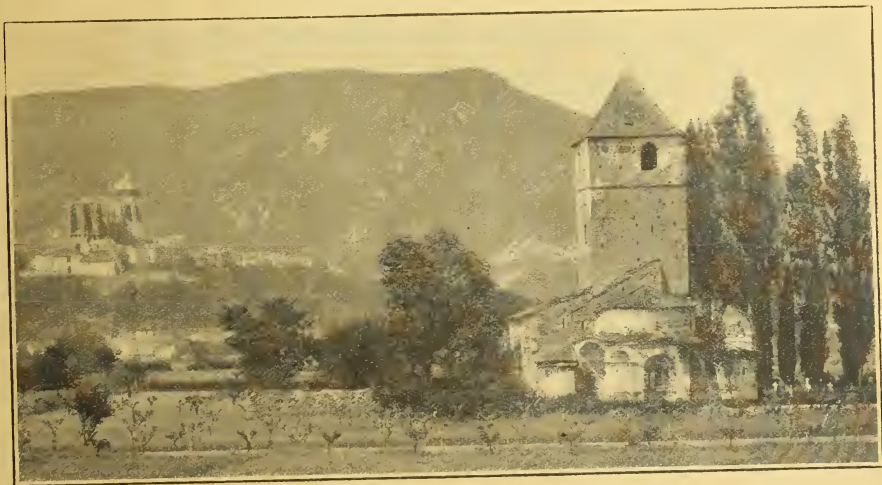
staff, etc., of St. Bertrand, ancient glass, and the remains of a lovely cloister looking sheer out over the smiling land; and then, not forgetting the inner man, you can lunch in the decent hotel, ten yards away—in its shady garden—where a comely maid will give you in choice style what you like of the good cheer the surrounding country so plentifully provides.

In Valcabrière, part of the great Gallo-Roman city, and which was then known as Vallis Capraria (Valley of the Goats), is the Church of St. Just, built on the site of a pagan temple. This church is largely built with Roman remains; and here you find the holy water fountains already mentioned. Valcabrière had formerly two monasteries, of which a fragment in high relief—the Hebrews in the fiery furnace—only remains. It is in the Toulouse Museum.

Before leaving Luchon, we may mention that in the Casino you have a remarkable model of the Luchon Valley, and the surrounding Pyrenees, reaching as far north as the main railway, showing lakes, cascades, forests, glaciers, snow-capped peaks, routes for pedestrians, equestrians, and carriages, frontier line; indeed, everything with absolute fidelity to scale and nature. It is the work of the Engineer

## REVIEWS OF CATALOGUES.

We have received from Mr. S. O'Dwyer, 24 Lower Ormond Quay, Dublin, two interesting publications, dealing with the firm of **Messrs. Richard Hornsby and Sons, Limited**, Grantham, England, for whom he is the Dublin representative. Messrs. Hornsby are the makers of the well-known Hornsby Stockport Gas Engines. The first of these pamphlets gives an interesting illustrated account of the firm's works at Grantham and Stockport. Both of these factories are of enormous dimensions. At Grantham the works cover no less than 40 acres, and give employment to 2,000 hands, the chief manufactures being gas, oil, and steam engines, agricultural machinery and implements, and boilers of various types. The illustrations and descriptions of the various workshops in this vast hive of industry are most interesting, telling, as they do, the story of the progress and present size of a gigantic industry. Similar remarks apply to the portion dealing with the Stockport works, which were, until recently, the factory of Messrs. J. E. H. Andrews and Co., makers of the celebrated "Stockport" gas engines. The present output at Stockport is about twenty engines per week—a fact which will convey some notion of the magnitude of the



The Church of St. Bertrand de Comminges, near Luchon, on the left.

Lézat, who trod every inch of what he so well surveyed, modelled, and reproduced with the extraordinary industry and art so characteristic of the French race.

While in Luchon, we had the honour of making the acquaintance of M. Le Chanoine L. Marceille, military chaplain (retired), Chevalier of the Legion of Honour, now chaplain to a college in Toulouse. This grand old priest, the image of Cardinal Newman, served in twenty campaigns under the Empire, and Republic; and, although not speaking nor reading English, knew much of Ireland, her history and troubles, and was full of kindness and sympathy towards her.

Our next stop is Lourdes, the great modern Mecca, which three-quarter million pilgrims and tourists visit each year.  
(To be continued.)

The Patent Indented Steel Bar Company's system of steel reinforcement is being used for the whole of the floors of the Waldorf Hotel in the Strand, and also for the foundations and the floors of the printing machinery department of the new "Morning Post" buildings. Amongst other important contracts, this company is supplying the steel reinforcement for the new dock works now in course of construction in Scotland by the Coventry Ordnance Company.

operations carried on in this branch of Messrs. Hornsby's business.

The second booklet is devoted to a description of the Hornsby-Stockport gas engine, and suction gas plant. This engine is the product of twenty-eight years of practical experience, and sustained investigation and experiment. The design has recently been improved, so that the engine now represents the very latest practice in this important and growing branch of engineering. The Hornsby-Stockport engine is renowned for strength, reliability, simplicity and ease of management. In the book the parts and accessories are described and illustrated in detail, showing the most modern improvements, such as the patent starting apparatus, the magneto-electric ignition, etc. The chapter dealing with the suction plant will be found exceedingly instructive by those who have already installations of this type of power production, or who purpose installing it.

Both publications can be obtained from Mr. O'Dwyer at the address given above.

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### LORD JUSTICE FITZGIBBON ON ENGINEERING JURISPRUDENCE.

In a characteristically amusing speech, Lord Justice Fitzgibbon delivered an inaugural address to the members of the Engineering and Scientific Association of Ireland, a large audience, with Sir Charles Cameron in the chair, being present.

In humorous fashion the Lord Justice referred to Architectural Registration, declaring that midwives and plumbers are now in a position to look down upon engineers and architects. Many witty observations he made, and referred to a few principles of law, but warned his hearers against playing the part of lawyers, for they were at best but bungling amateurs. It had been suggested by the deputation which had met him that some arrangements should be made whereby the Association could learn something in the form of lectures as to their relations to the law. The book that had proved most valuable to the legal profession—the most valuable book on the face of the earth in the eyes of lawyers was a little book entitled—"Every man his own lawyer." He need hardly remind them of the saying that a man who is his own lawyer has a fool for his client (laughter). He was quite certain, however, that his friend who was about to give the lecture was aware of the distinction between training them as lawyers and instructing them in the matters which would bring them within the reach of the law; be tween making them bungling legal amateurs and wideawake engineers. He did not know any professions which were more closely connected than that of the engineer and that of the lawyer; but they regarded each other from different standpoints. The engineer's was usually that of the witness box, while the lawyer's was that of the counsel who had to produce a large quantity of expert evidence, or of the counsel who, being faced with such a large mass of evidence, found himself in the position of having to discredit it, and then build up a mass of other expert evidence on the other side to overthrow it (laughter). He never read a programme that appeared better calculated to be useful to their profession than the present scheme, for which, he believed, the credit should originally be given to Mr. Purser.

An Association such as theirs, which had gathered into it a great variety of men who were engaged in all that went under the name of engineering and practical science, was most important. In these days the ambit of their work was increasing, and their numbers rapidly growing. The little word "power" had acquired a multitude of meanings, but with it there was always included the sense of responsibility. "Go on and prosper," was the best advice he could give them. He said he was afraid the only subject that needed introduction there was himself. He had esteemed it a great honour when, some twelve months ago, a deputation of friends from the Engineering Association had called upon him and told him, in vague terms, that it was intended to have a series of lectures on the Law of Engineering. He subsequently met other representatives of the Association, headed by Sir Charles Cameron, when the subject took clearer form. The consideration of how far an Association such as theirs could promote the organisation of their great profession was most important. There was no more interesting subject than the history of organisations, not only of professions, but also of trades and arts. The profession of the surgeon began with a trade—that of the barber-chirurgeon. The trades had, in the earliest times, to form distinct organisations, and so it had been in later days that profession after profession had endeavoured to form constitutions of their own. Fortune had been capricious in regulating the success of these endeavours. The latest to be successful were midwives and plumbers (laughter), while nurses were still engaged in internecine warfare with the doctors as to the form their registration should take. But at present the plumbers were in the happy position of being able to look down on engineers and architects (laughter). There could be no question about it, that qualifications in these days were most important in any calling, and ought to be kept for verification. In order to obtain verification there should be some standard of qualification. Such a standard could only be fixed, and the organisation formed, by those who knew the needs of the profession concerned.

Mr. Boyd then delivered his first lecture of the course on "Engineering Jurisprudence." He dwelt at considerable length and in great detail on the law of contract, the principles which underlie it, and the difficulties which arise. He summed up much of what he said in detail by mentioning that, to form a good contract likely to stand in law, it should be first written down, and next should be understood by the parties. Alterations should be provided against, and an undertaking to observe the contract in respect of same, embodied.

Oftentimes impossibilities were included in contracts.

Contingencies, usages, and customs affected contracts also. The lecturer dwelt upon the liabilities of engineers to their clients and others, and mentioned, in passing, that a person giving his services gratuitously, although he could not be compelled to carry out the work, yet if he does it so negligently as to cause loss to him for whom he does the work, may be liable for damages.

Generally speaking, the lecture was interesting, and treated at length of general law, apart from special matters, considered in connection with the rights and obligations of an engineer in respect of various persons; contractual obligations as between him and his employer, and between him and his employees; various statutory obligations to the public generally; obligations to respect rights of other persons individually; relation with employer, either as agent or independent contractor; both arise out of contract; nature of contractual relations; modes of effecting contracts; requisites of valid contract; capacity of persons to enter into contracts; matters affecting the validity of contracts; assignment of contractual rights, evidence of contract; construction of contract; discharge of contract.

Nevertheless it was decidedly disappointing, inasmuch as the matter treated of might have been much more directly applied to engineering problems and difficulties, much of it was rather elementary and of general character, and much of it would have applied equally to any other calling; however, the remaining lectures of the course promise to be of more particular and detailed interest. They will be as follows:—

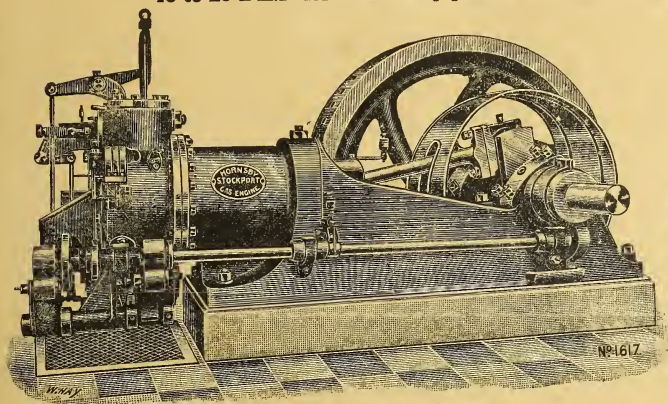
Monday, 3rd December.—Lecture IV.—Engineers' duties as regard rights of third parties; duty to employer not to affect rights of third parties; also to observe all public duties; engineer also personally liable for breach; duties under various statutes and bye-laws of local authorities; obligations on third parties not to interfere with rights of property; as to ownership of real property; trespasses; nuisances; easements; rights to light and air; rights of way.

We may add that the fee for the course, to non-Members of the Association, is Five Shillings, payable to Mr. J. G. Mann, Hon. Treasurer, Springville, Blackrock, Co. Dublin. The *Freeman's Journal*, in an interesting note published a couple of days afterwards, mentions that the Royal College of Science, in which the meeting was held, is full of memories and associations of lawyers and the law. It was the house of the first Lord Manners, who had been English Solicitor-General and a Baron of the English Court of Exchequer during the period of twenty years from 1807 till 1827 of his tenure of the Lord Chancellorship of Ireland. Lord Manners was the first-cousin of the Duke of Rutland, who died in the Viceregal Lodge, as Lord Lieutenant of Ireland, in 1787, and whose manners were as genial as the manners of the Chancellor were austere. It was his custom on Sundays to head a procession of his servants, two-and-twenty in number, and to walk, prayer-book and hymn-book in hand, to church. His judgments were generally satisfactory, and the gossip of the day attributed, correctly or otherwise, his decisions to the revising hand of William Saurin, the Orange Attorney-General from 1807 till 1822, who was a profound equity lawyer and on terms of intimate personal and political friendship with the Chancellor.

Lord Justice FitzGibbon, in acknowledging the vote of thanks, asked how did they stand with regard to this address as people who would be called upon to perform a duty to two other parties who had opposite interests, because the architect or the engineer was brought into the position of doing his duty to the employer and to the workman? Let him first see that when they went to make a contract they should write it down, and, when it was written, that they both understood it; and in order to understand it, it must be clear and complete. The next thing was a very important one as regards completeness. Every alteration, every addition, every variation, even a rescission, was in law a new contract. And how many actions for extras had been brought about by forgetting to observe with regard to them all the precautions that they were bound to do with regard to the original one? (Laughter.) Then, again, how many actions had been brought about because plans had things in them that were not there at all? (Laughter.) Then they should provide for contingencies—they should be prophets (laughter); and some contingencies that would turn up would probably be ones that no reasonable man could anticipate. Engineers, when framing contracts, had better look out as far as they could, even for the contingency of the impossible in the performance of their contract. (Applause.) Yet law and engineering were continuously connected from the time the contract was drawn to that moment when the final account, which usually transcends the employer's darkest expectations, was presented.

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## LAWYERS AND LABOURERS.

At the inaugural meeting of the Incorporated Law Society of Ireland, the president referred to the new Labourers Act, and to the fashion in which the solicitors' intervention has been so extensively eliminated, being reduced to appearing on behalf of promoting authorities at enquiries and arbitrations, and to the investigation of titles. Hitherto "the schemes" were in charge of the solicitors to the councils, and they were responsible nominally for the drafting of the necessary documents, but their preliminary work was in the main of a practically mechanical or clerical character, the real work being done by the clerks to the councils, aided by the architects, who, between them, provided every item of information required, the solicitor simply putting it together in the petition. Under the new Act, the clerk is made responsible, and, as a matter of common honesty, is allowed a very moderate fee for his trouble. The president voiced the indignation of the legal profession at this change, and thereat we do not wonder, for it removes a considerable source of revenue. But the lawyers cannot complain, as since 1883 they have undeniably had the "plums." Their share in the labour was comparatively small, soon over, and their fees quickly earned before the building began. If this change presses severely on many solicitors, their profession has itself largely to blame; the fees charged in many instances being extravagantly high, the legal expenses formed an alarmingly large proportion of the whole cost of a scheme. Three guineas per cottage, whether sanctioned to be built or not, was, we believe, a very common rate—that means a lawyer's bill of six hundred guineas, with extras for stamp duty, etc., in a two hundred cottage scheme. Compare this with the average earnings of the architect for such works, and his responsibility goes on for years; while as much as ten guineas per house, or a thousand guineas per 100 cottages, has been paid by some local authorities to solicitors.

The president, in the course of his observations, we

regret to note, indulged in a rather unworthy jibe at the L.G.B., the medical officers, the clerks and the architects, alleging that the officials named had received preferential treatment at the hands of the L.G.B., and suggesting that they were better treated than the lawyers because they had "friends at court" in the shape of representation on the Board, while the lawyers had none! What are the facts? The local Government Board for Ireland consists of the Chief and Under Secretaries, a vice-president, and two ordinary members, none of whom are either engineers or architects. One gentleman, it is true, is a medical man, but not one of the members of the Board is clerk to a district council. The Board has certainly both an engineering and a medical staff of inspectors, but we venture to say had the matter been left in the hands of the inspectors, with their personal knowledge of the work, both doctors and architects would have fared at least somewhat better than they have; so much for the alleged bias. As for the preferential treatment, as our readers by this time know, the architects receive far less than half the fees that some councils were willing to pay. The clerks of council receive a very modest fee per house for all their trouble, and the dispensary doctors get five shillings for inspecting and reporting upon an unsanitary dwelling, and two guineas per day for attending an enquiry, as against three guineas allowed to the solicitor. The printer, of course, as we have already pointed out, will absorb a good deal of the savings, by reason of the over-numerous forms to be kept in stock by district councils.

The president further mentioned that the solicitors had had counsel's opinion, and that Mr. James H. Campbell declared some of the savings effected in legal expenses to be *ultra vires*, or illegal, and the President even threatened the clerks with prosecution and other pains and penalties if they carried out certain duties which the L.G.B. have cast upon them. This opinion we are in no position to dispute, but the legislature designed the Act to shorten and cheapen the proceedings, and if the Act ends in such dreadful results to clerks of councils we fancy the legislature is capable of setting the matter right.

The president went on to declare that this change, so detrimental to lawyers' interests, had been brought about by clerks of council volunteering to perform legal work. We venture to suggest that the president has been misled in his sources of information. The clerks have no reason to pine for additional work. In the majority of cases they are already overworked. The change was brought about by public opinion.

## COMMENTS.

### Cheap Cottages in Ireland.

In our last issue we drew attention to the advertisement of the Local Government Board for Ireland in our columns, inviting architects to submit designs in competition for a labourer's cottage, to be built in Irish rural districts, of simple design, calling for the minimum of skilled labour. The conditions of competition seem very fair, and the prizes sufficient to attract a good competition. It will be remembered that under the new Labourers Act the L.G.B. undertook to supply free plans and specifications to local authorities. Although the Act came into force on 1st inst., these promised plans are not yet available, but there can be no doubt that the L.G.B. are now proceeding on the best and fairest lines most likely to secure an adequate response, and a "model plan" in the true sense. The accommodation asked for is modest, and suited to the simple requirements of an Irish labourer—if anything, the rooms asked for err on the modest side, but the real difficulty is the price. In some parts of Ireland, notably certain districts in the North, where brick is cheap, the problem is easy of solution, and presents few difficulties; but in others it is well nigh impossible to build a good cottage for £130, the amount stipulated. Sound, plain, and thoroughly durable construction is a *sine qua non* in an Irish labourer's cottage, and the

L.G.B. are seemingly fully alive to that fact. Soundness of construction, with consequent cheapness of maintenance, are the salient virtues to be desired in such a design, and are qualities for which no ingenuity of planning, superior accommodation, or more artistic design can adequately compensate for. Let us hope that the competition may result in the evolution of a series of designs, combining all these qualities in a high degree, and as far as is compatible with the limited price.

When the design is selected, it should be remembered that no one pattern will suit all Ireland, because some of the councils of the metropolitan county have liberal notions on the subject, and desire to see a roomy and good cottage built, even if it costs a little more money, and have a much higher standard of comfort in view for the labouring man; while other districts in the North and West desire economy above all; in fact, in very poor districts, if the Act is to be put in force at all, it is manifest that the Councillors will not regard with favour the idea of building a house at the public cost far superior to the dwellings occupied by the majority of the ratepayers. A cottage containing, say, a large living room, three fair-sized bedrooms, scullery, out-offices, etc., built of substantial and durable materials, would, in many poor districts, be infinitely a better house than that enjoyed by the bulk of the ratepayers.

When these are finally adopted, and issued to the Councils, it is to be hoped that, in cases where they so desire, they may be allowed a certain latitude in modifying and adapting them to suit the requirements of particular localities, or permitted to adhere to their own designs.

In connection with these points it may not be out of place to quote an extract from "The Builder" report of a bankruptcy case which arose out of the exhibition of cheap cottages at Letchworth last year. Considerable doubt has from time to time been expressed as to whether it was at all possible to build any one of all the cottage types exhibited, at or any way near the alleged cost, and on this point "The Builder" pertinently observes:—

From what occurred in the Luton Bankruptcy Court last week it is evident that these doubters were right. The person who was under examination was a builder named Wright, who had exhibited some £180 cottages at the Garden City. This bankrupt person stated that one cause of his difficulties was this same exhibition. He had, it would appear, expended money on these show cottages, for which he received no return. The most noticeable point, however, was his statement that though the cottages were shown to the public as £180 cottages, the actual cost was £230. It is evident from this evidence that those who were responsible for the Garden City Cottage Exhibition were grossly deceived in one case, at all events. And if there was one case of deception admitted, how many have been concealed?

While on the subject of labourers' cottages we reluctantly revert to the unsavoury subject of "fees." Several times, in our columns and elsewhere, the Irish Institute was urged to take action in respect of fixing of an adequate scale of fees for architects employed under these Acts. It is almost incredible, but nevertheless a fact, that the Institut. actually suggested to the Local Government Board to fix the maximum inclusive fee at from 2½ to 5 per cent. The South Dublin Union suggested 5 and extras! Naturally enough, the L.G.B. followed the advice of the Institute, and fixed the lower rate, 2½ per cent., as the maximum. It is difficult to see how the Institute can revile the Belfast "Four per centers," as a correspondent called them the other day, or can complain of any member who reduces his fees below the standard scale, in order to secure work.

#### Public Officials and Private Practice.—Action by the Institute of Architects.

For a long time past the subject of the employment of salaried public officials in non-official architectural and engineering practice, has been felt and generally regarded as a grievance of international importance to architects and engineers engaged in private practice in the principal European countries, and has been deemed

of sufficient importance to form a subject for discussion at the last and previous international congresses of architects, when the French, German, and Austrian delegates spoke in condemnation of the practice as unfair and detrimental to artistic advancement. In no country has this been more felt than in Ireland, first because many of the officials so employed have no training whatever on the architectural side, and but little beyond a text-book curriculum in the varied and complicated problems that daily arise in the experience of a civil engineer in fair general practice, their work being largely in a special groove.

Such a state of things is not good for art. No matter how poor an artist a private architect is—and we are not denying that there are many careless and indifferent practitioners—still he is in touch in a certain way with what others are doing, and his work is, as a rule, artistically at least, somewhat better than the average official output. On the other hand, we are perfectly well aware that public services contain many brilliant men—but they have chosen their walk in life, and should adhere to it. Looking at the matter from a more utilitarian point of view, and from the disagreeable monetary standpoint, there is an additional reason why this grievance presses unduly upon private practitioners. It is this: the salaries enjoyed by the higher public officials in Ireland are far higher, on an average, than the incomes of the average architect or engineer, even amongst men who have been fairly successful, added to which the official enjoys security of tenure, regular pay, and the assurance of a pension in old age—advantages which are conspicuously absent from the private practitioner's economy.

Concerted action has eventuated within the past few days, however. The Royal Institute of Architects in Ireland has issued a circular letter to its members, inviting individual communications and reiterating these facts, and declaring that the design and supervision of works other than those which the terms of their appointments legitimately cover, to be "a serious menace, not alone to the interests of architects in private practice," but also "to the development of the art of architecture itself." The utilitarian point is an unbecoming one to press, but it cannot be helped. True, the ideal architect, provided he can live in modest comfort, should look for his reward, not to the making of a large income—such a man would be better engaged in commerce—but to the consciousness of work well and honestly done, that he has "done his best." How few there are, even amongst the successful, whom circumstances permit to follow this ideal! Then the profession is becoming very overcrowded, and how to find work enough to enable all to live, is a problem, so that false modesty and an affection of regarding the financial aspect as a subject not to be broached in polite society, must be abandoned perforce, unpleasant as it is to the man who cares for his calling for itself. There is, however, another side to this question, which in any discussion must not be lost sight of. It is this: When this agitation first took shape in Ireland, the county surveyors, against whom it was mainly directed, had a somewhat better standing than at present. Their positions were won in open competition, and their salaries were uniformly good. The advent of local self-government has largely changed this. The positions are won, not as the result of merit alone, but of influence, private, political, and even, it is said, sectarian; in fact, as is recorded elsewhere in our present issue, one gentleman was recommended for the important post of county surveyor by a supporter who urged, as a main qualification, that the candidate could speak Irish! That accomplishment is, no doubt, an excellent one, tending to broaden a man's mind, but hardly a prime recommendation for a professional appointment. The county surveyor of to-day is frequently underpaid, several having a salary so low as £300 a year, out of which they have to pay all their travelling expenses—no inconsiderable item; and it is hard to blame such men for seeking to augment so meagre a stipend by private practice. If the Institute and private practitioners agitate to prevent public officials from engaging in private practice,



they are bound to throw the whole weight of their influence on the side of the officials, in securing for them adequate remuneration. Such a salary as £300 a year for a county surveyor, including travelling expenses, should not be tolerated for a day, and the Local Government Board should be endowed with power to insist upon the local authorities paying their officials properly.

The Irish county surveyors' department is a service which has established a splendid record for itself, and one of which any body of engineers might well be proud. The new men have these high traditions to live up to. They are expected to possess extensive professional attainments, having to pass a very severe examination, and, in addition, to be gentlemen of spotless honour in all their professional dealings. The tendency of the local authorities to appoint on political and private grounds, and to cut down salaries below a fair minimum, must be curbed in some way if the fine traditions of the service are to be maintained. In any agitation to this end, the officials, we doubt not, will have the warm support of all their professional brethren. Therefore, while the Institute circular letter comes most opportunely, if somewhat tardily, it implies no spirit of hostility, but rather one of "live and let live."

### Current Topics.

In his inaugural address, the other day, the President of the Society of Architects, Mr. A. E. Pridmore, referred to some prevalent current topics in the architectural world:—

#### Government Control of Art.

Recently, I accompanied the Lord Mayor of London on his visit to Paris, and was delighted beyond expression with the magnificent streets and majestic public buildings. Paris is in appearance quite a new city when compared with London, and the law evidently allows the Parisians to acquire properties for public purposes with much greater facility than here, and hence the splendid manner in which the streets are planned. I went to Paris as a member of the Court of Common Council of the City of London, and also as President of this Society, and in the latter capacity received a most cordial reception from most of our eminent and distinguished confrères. Art is much revered and appreciated in France, and a Minister of Fine Arts is appointed to preside over its destinies—we might do well to imitate and have our art treasures and historical monuments controlled by the Government. A visit to Paris next summer by the Society would be a highly interesting outing, and is worthy of being carefully considered at an early date in order to learn if the suggestion meets with the general approval of the members.

#### Registration.

Continued effort on definite lines must bring success. Keep to the path, do not be led away by side issues. Remember that no scheme of registration which does not embrace the whole profession will be of the slightest use.

A proposal which has for its basis the restriction of Parliamentary powers to any single institution, cannot under the present condition of things have the least chance of securing the approval of Parliament, which, in my opinion, would not grant a monopoly, whereas, the principle expressed in the Society's Bill is one which I venture to say would meet with general approval. Now, as ever, the opposition, so far as our Society is concerned, is from within the profession, and is confined principally to questions of detail. The principle has long been admitted and acted upon by all concerned, and while there always will be differences of opinion on minor matters, it is satisfactory to feel that much of the old misunderstanding has been lived down, and there appears to be every prospect of further favourable development in the future. In the meantime it only remains for us to go on with our Bill.

#### Salariéd Officials and Private Practice.

Just now there is a revival of the outcry against the principle involved in salariéd officials undertaking private practice, more especially the carrying out by them of large public buildings. No doubt there is a real grievance here, but it is aggravated where a local authority places its architectural work in the hands of an official whose training has not been in any sense architectural. In such cases the local authorities endeavour to appeal to the ratepayers, as against the architects, on the ground of an apparent saving in the rates in having no outside architect's fees to pay, whereas, as a matter of fact, it is very often the case that the building is found to have cost a great deal more than would have been the case by employing an outside architect. The latter is often in the unfortunate

position of having to contribute to the support of a department which is robbing him of his legitimate field of operation, and he suffers as a ratepayer as well as an architect.

It is, of course, to some extent, the architect's own fault, as even local authorities could be dealt with under an Act of Parliament. The outcry is against the system, and not against the individual, who would frequently prefer not to have the additional responsibilities thrust upon him, and who is often placed thereby in a very difficult position in regard to his relations with his brother professionals in the district.

The bitter cry of the architect is heard not only in England, but in Ireland, where, however, steps have been taken in the right direction by the insertion of a clause in the Labourers' Act, which prevents the employment of an unqualified person as architect for the purpose of the Act. Grateful as we are for the concession, it does not go to the root of the matter, and nothing short of Registration will protect the architect from unfair competition by public bodies as well as individuals, or the public from having thrust upon them buildings which can, in some instances, only be characterised as monstrosities.

#### Light and Air.

An important decision of the House of Lords on "Light and Air," was given on October the 25th last, in the action of "Jolly v. Kine," the parties in this case being the owners or occupiers of two adjoining plots of land forming portions of a building estate situate at Acton, in the County of Middlesex. The arguments were chiefly based on the well-known case of "Colls v. The Home and Colonial Stores," at the conclusion of which, it will be remembered, Mr. Colls was presented by the Society with a tangible token of their appreciation of his efforts on a question of principle. The Lord Chancellor, in "Jolly v. Kine," expressed his profound regret that, in a matter comparatively small, such enormous costs had been incurred. It behoves architects, therefore, to be very careful and cautious when even a trivial question of "Light and Air" is raised by a neighbouring owner or occupier, as it might land a client into a serious position. The case is too long to refer to at length in my address, and those interested in legal matters should read the report of the case in full.

Some years ago the Society petitioned the then Lord Chancellor (Lord Halsbury), with a view of obtaining an amendment of the law on the lines which are found to work so well in Scotland, where it is possible to ascertain exactly beforehand the limit to which an adjoining owner can go, so saving the consequent risk and expense of an injunction.

Possibly an interview with the present Lord Chancellor might do something towards bringing about a more commonsense method than at present prevails in England.

The president did not forget the claims of charity, for he warmly commended that splendid institution, the Architects' Benevolent Society. When he said, however, that it was supported by one-fourth of the profession, he overstepped the mark, for we believe we are correct in saying that but a very small percentage of architects subscribe, and in all Ireland only two or three, though its benevolence is widespread and not restricted.

#### Benevolence and Charity.

I spoke just now of apathy in the profession, and I think I was justified in doing so, when I consider the attitude adopted by the profession towards such an object as the Architects' Benevolent Society. Architects have been individually passing through a time of great difficulty and depression, the population is not increasing at the same ratio as heretofore, and, therefore, proportionately so many extra buildings are not required for housing. It is estimated that there are over 60,000 houses to let in the London district, which does not allow of numerous new buildings being erected that will show a reasonable profit on the outlay. Architects, on the other hand, are becoming more numerous, and where sufficient work is to come from is a serious question that they will have to face. Registration would have a restrictive effect, and prevent overcrowding and consequent distress. Architects, however, are not unmindful of their obligations to their less fortunate brethren. Why, then, is it that the Benevolent Fund is not supported by more than one quarter of the profession? Would it not seem that this is due to the fact that the work of the Benevolent Society is practically unknown, or that it is too limited in its scope. If so, the remedy evidently lies in re-organisation on a more liberal scale.

The benefit of the fund might be extended to include not only those in immediate distress, but also those who may wish to make provision against contingencies, such as sickness and temporary loss of employment. This would be a real boon to many, and it would appeal to every grade.

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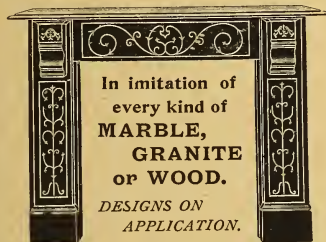
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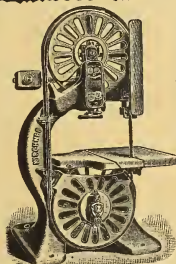


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## THE NEW GRANITE COMPANY.

Although the granite trade has not been very brisk during the present year, we are pleased to see that the New Granite Co., Carrigart, County Donegal, has been making good

stone, which takes a high polish, and is, we may say, one of the finest stones produced in Ireland. The Company quarry it exclusively for the monumental trade.

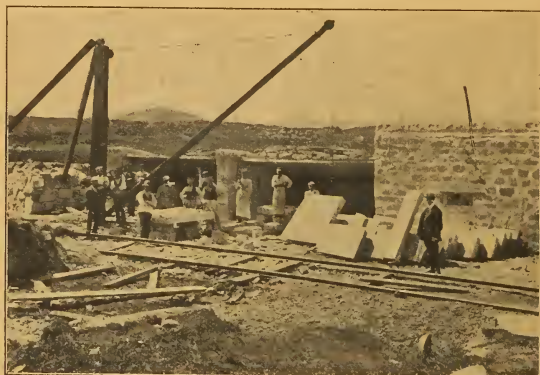
All the granite is close to the surface of the ground; only a few inches of soil have to be removed, and blocks of large sizes can easily be obtained.

No expense has been spared during the last three years in putting the granite on the market. Up-to-date methods of working are adopted, steam cranes, Ingersoll drills, etc., and the Company are installing further plant this winter to enable them more thoroughly to cope with the demand for their granites in the spring.

We understand that they also intend putting in another quay, where they can load vessels up to 1,000 tons burden. This quay will be in Mulroy Bay, and sheltered by Ballywhoriskey Island, and will enable them to ship their productions all the year through. The first quay constructed by them faces the open Atlantic, so shipping can only be carried on for about nine months in the year; it is, however, a fine loading berth, and steamers up to 500 tons load there.

The amount of good such an industry as this does in a country is inestimable, particularly in the Donegal congested districts, where the circulation of money weekly means everything to the small farmer and fisherman.

The Company now find employment in their No. 1 quarry for about 60 to 100 men, and when all their quarries are going over 200 men are employed. They certainly deserve to be supported by Irish surveyors,



Fine Axed Work (steps standing).

progress, and has had a fair share of orders.

This Company's quarries are situated in Ballywhoriskey, in the Fanad Peninsula, about 500 yards from the Atlantic, and from their pier they have shipped to Liverpool and Preston several cargoes of blocks suitable for monumental purposes, and many cargoes of setts, curbs, etc., to Liverpool, Preston, Londonderry and Cork.

The Company are at present working three different quarries, their chief quarry being a grey granite, similar to Aberdeen, which is chiefly used for building material and for setts and curbs.

This granite is very uniform in colour, and is free from iron and spots. It can be had in blocks of any size, and is extremely suitable for steps, landings, sills, etc. It may be noted that all the steps and landings in front of the new Cathedral, Belfast, were supplied in this stone. It also makes a first-class sett, as it stands a test of 1,800 tons to the square foot, and will not polish, as mica, quartz, and felspar are present in correct proportions, so that when the mica wears, the quartz and felspar sustain the wear, and thus give a rough, non-slipping surface.

The Company have at present large inquiries for setts, and they are installing further machinery to enable them to cope with same.

Londonderry Corporation, after careful tests made by the Surveyor (Mr. W. J. Robinson), adopted this granite for use in their streets, and, having sett-paved most of the principal streets on the city side of the river, are now turning their attention to the waterside.

wherever possible, as they have shown it is possible for Irish granites to be quarried efficiently, and to compete



Sett Makers at Work.



A View in the Quarry.

successfully at the present with any granite in the market.

This Company have obtained the quarrying rights over one of the finest granite areas in Ireland, and it is due to them that the Donegal granites are now taking their place in the markets both at home and abroad. We think, however, that locally they deserve more support. Surveyors seem to

#### DUBLIN UNIVERSITY ENGINEERING STUDENTS' SOCIETY.

Last week in the Lecture Theatre, Trinity College, the opening meeting of the session of the Dublin University Engineering Students' Society, a lecture, entitled "Hennebique Ferro-Concrete—Theory and Appliances," was delivered by M. L. G. Mouchel, M.S.C.E., France. Professor Alexander presided. There was a large attendance.

The lecturer described the Hennebique Ferro-Concrete as a system by which concrete was strengthened by embedding in it steel bars, so that the steel would take all the tensile stresses, while the concrete would take the compressive stresses. By this means buildings of great strength, durability, and fire-proof were obtained. He also described how the system was applied in connection with sea works. It required no annual output to maintain it, as would be the case with timber and other materials. He exhibited numerous limelight views of works which had been carried out at which the system described had been adopted.

On the motion of Mr. A. E. Mills, seconded by Mr. C. F. Draper, a vote of thanks to the lecturer was passed amid applause.

The Provost of T.C.D. having been called to the Chair, a vote of thanks was passed to Professor Alexander on the motion of Professor Young, seconded by Mr. Adderly.



View of Tramway and Pier, Showing Dressed Setts (New Granite Company's Quarries, Co. Donegal).

follow the lead of their brethren in large cities across the water, and so we often see specifications drawn up which mean that Welsh or foreign setts must be supplied; this should not be, when they can find a suitable material at home, and can get same, perhaps, at a lesser price, with as prompt delivery.

Samples of the granite can be had from the Company's agent, John McNeill, 8 City Quay, Dublin, and Ocean Buildings, Belfast.

#### A NEW DIRECTORY.

Messrs. Alex. Thom and Co., Ltd., Publishers of Thom's "Official Directory," announce that they are now preparing for publication an entirely new work, entitled "A Directory of the Manufacturers and Shippers of Ireland."

There is in Ireland itself a strenuous and sustained movement for the promotion and development of the manufacturing industries of this country. It is unquestionable that amongst Irishmen abroad, as well as in the United Kingdom, there is a generous desire to widen the markets for Irish products. They feel both pride and confidence in the high quality of Irish-made goods, which they well understand to be honestly manufactured from sound materials. They have money to spend on Irish-made goods, but they are out of reach of supplies, unless they have at hand means for finding out where to send for them in Ireland. The new Thom's Directory is designed as an authoritative work of reference for that purpose. Every manufacturer in Ireland is asked to send his name to the publishers for inclusion in the book.

The return of the imports of timber into the United Kingdom for the month ending 31st October, and for the ten months ending the same date, shows a considerable increase on the quantities for the corresponding periods of last year, the advance for the ten months being about 13 per cent. The figures for Ireland for the same period show an even greater increase, amounting in fact to almost exactly 25 per cent. The rise in imports is distributed over all the Irish ports, the following being the increases for the principal centres:—Belfast, 14 per cent.; Cork nearly 40 per cent.; Dublin, 25 per cent.; Galway, 33 per cent.; Limerick, 20 per cent.; Derry, 50 per cent.; Newry, over 80 per cent.; Tralee, 20 per cent.; Waterford almost 100 per cent. Dundalk alone shows a decrease (15 per cent.), and in the case of some of the smaller ports the increase is enormous, this year's imports into Sligo, for example, being nearly nine times as great as those for last year.

The recent hurricane on the coasts of the Gulf of Mexico might be expected to bring about an advance in the price of pitch pine owing to the great destruction of forests and saw-mills, and the scattering of the huge piles of logs already sawn. The actual effect, however, has been to make the market on the spot most unsteady, and it will be some time before confidence is restored. The principal cause of the uneasiness is the fear that there will be an enormous over-production in the near future. Millions of acres of woodland have been levelled along the Gulf Coast, and the fallen trees will have to be speedily taken in hands by the lumbermen in order to save them from worms. If they are not cut without delay they will be a total loss. To manufacture such enormous quantities at once will, on the other hand, glut the market, though there seems to be no way out of doing so. The result will be that, unless conditions are much exaggerated, there will be great over-production.



SS. Andover loading granite at the New Granite Co.'s Pier, Ballywhoriskey.





**Belfast.**—It is expected that very soon the congregation of the Cregagh Road Presbyterian Church will be in a position to proceed with the erection of a new church building.

The Local Government Board have sanctioned the sketch plans of the proposed children's infirmary at the workhouse, as outlined in the Guardians' minutes of the 30th October, and state that they are prepared to sanction a loan for the erection of the building when the full plans, specifications and estimates were put before them.

**Ballymoney.**—The Lord Lieutenant opened the new technical school at Ballymoney. The school has been erected to meet the requirements of the Ballymoney urban and rural districts. A site measuring 160 feet square was granted by Lord Antrim for a term of 999 years at the nominal rent of one shilling per annum.

**Baltinglass.**—The Local Government Board have granted a provisional order to the Baltinglass No. 2 Rural District Council confirming their improvement scheme for the erection of 22 labourers' cottages in the various electoral divisions.

**Ballinallee.**—Extensive repairs on the Roman Catholic Chapel about to be carried out, consisting of masonry, wood-work, painting, etc. Tenders are invited.

**Clonmel.**—At the monthly meeting of the Joint Committee of Management of the Clonmel Lunatic Asylum Dr. Harvey said he supposed the committee might now go on with the erection of the consumptive blocks, and pointed out the large number of deaths yearly in the institution. The members regarded this as very serious, and agreed that something should be done. Dr. O'Ryan said he was strongly in favour of the new buildings, which he said would not cost more than £1,500 or £2,000 each. It was decided to proceed with the erection of two blocks. Mr. J. F. Fuller, of Dublin, is the architect.

Tenders were received for the erection of a new clerestory, apse, and sacristies to St. Peter and St. Paul's Church, Clonmel, for the Very Rev. Canon Flavin, F.P., according to the designs, etc., prepared by Ashlin and Coleman, architects, 7 Dawson Street, Dublin, and Mr. D. W. Morris, Surveyor, 68 Harcourt Street, Dublin. This church had a very fine addition put to it some thirty years ago by the late J. J. O'Callaghan, including the base for a campanile, which was never finished. The additions are of Romanesque character, simple but very good, and an excellent example of O'Callaghan's masterly knowledge of church work, being designed when he was in his prime.

**Clonakilty.**—The Clonakilty Urban District Council will on 8th January, 1907, receive plans and detailed estimates for the erection of ten artisans' dwellings in one block, each house to contain on ground floor a kitchen and parlour, and on second floor three bedrooms; each house when contracted for to cost not more than £130, which is to include yards, earth closets, drainage, eave shoots to all houses, and footpath in front. A remuneration of £10 will be given for the selected plan, to be subject to the approval of the Local Government Board.

**Dublin.**—Messrs. Wm. Coates and Son, Ltd., 5 Leinster Street, have secured the contract for the electric lighting of the Corporation Libraries. There will be about 200 lights in the installation. This firm are carrying out the electric lighting installation at the forthcoming Exhibition, and have given the General Electric Company the order for the main switch-board, which will control the whole of the electric lighting and power in the Exhibition. Some 15,000 Robertson lamps will be installed.

Mr. Henry Pemberton, Ballybrack, is building three shops in Baggot Street.

At Ashtown Lodge, Phoenix Park, the residence of Major Dugdale, an installation of acetylene gas is being put up by Messrs. Lawson and Sons, St. Stephen's Green, Dublin. The plant used is constructed under Allen's Patents, for which Messrs. Lawson and Sons are sole agents. They

recently completed the lighting of Holy Church at Ashford, and hotels and business premises in Oldcastle and Phillips-town.

Messrs. James Donovan and Sons, Hatch Street, are at present engaged on new premises at 32 Arran Quay, for the National Bank.

Messrs. J. Pemberton and Sons, Ranelagh, are at present building additions to the electric lighting station of the Rathmines Urban Council.

Messrs. Heffernan Bros., 13 Wood Quay, are at present demolishing the old building at 80 Lower Clanbrassil Street, and erecting in its place a new dairy and out-houses. They are also reconstructing Mr. O'Rourke's licensed premises at Main Street, Newbridge.

The Estate and Finance Committee of the Dublin Corporation are about to erect temporary offices of wood and iron in Lord Edward Street, and invite tenders to December 6th.

Mr. Scott, of Usher's Quay, has just completed alterations and additions to the old Ophthalmic Hospital in Lincoln Place, according to the designs and specifications of Mr. Robert Stirling, Clare Street. It will be let out in shops and offices.

**Emyvale.**—The new dispensary buildings at Emyvale have been completed. The new structure has been built at a cost of £937. Out of a large number of tenders received, that of Mr. Henry McGeough, Old Cross Square, Monaghan, was accepted at the above-mentioned sum. The new structure is two storeys high, and has a frontage of 45 feet. It is built throughout of rubble masonry and brick. Mr. W. A. Scott, architect, Dublin and Enniskillen, was responsible for the plans and specifications. The ground storey comprises a spacious hall-way leading to the dispensary, a waiting-room 12 feet square, medical department, and the dispensary proper. A handsomely finished porch brings the visitor into a well-lighted hall-way. To the left of the latter is a spacious dining-room 19 feet by 14 feet 7 ins., and a cosy sitting-room 12 feet square. To this portion of the establishment are added a scullery, kitchen, larder, and other requisite accommodation. The fine, broad staircase of pitch pine, with mahogany rails, forms an attractive feature of the interior. The upper storey contains four bedrooms, with bathroom, w.c., etc. Lead light windows give an abundance of light to every part of the building. All local brick as far as practicable was used in the construction of the work.

**Kingstown.**—The refuse destructor building at Kingstown, the contract for which is being carried out by Messrs. A. Hull and Co., Ringsend Road, will shortly be completed. The new road along the railway, which has been designed for the purpose of relieving the congestion in the main street, has also been completed, and is now open to the public. We hear, also, it is the intention of the Council to build new markets for the township.

**Lisburn.**—The foundation stone of a new Masonic Hall for the brethren of Blaris Masonic Lodge No. 147 has been laid.

**Lisnaskea.**—One hundred and twelve labourers' cottages are about to be built by above Rural District Council. The estimated cost of each of the 128 plots is £44, which amounts to £5,632, including compensation to landlords and tenants. The cost of each of the 128 fences, at £8, amounts to £1,024. The cost of building each of the 112 cottages is estimated at £180, making a total of £20,160. For legal expenses, £320; engineering expenses, £350; and incidental expenses, £420. The total estimated cost of carrying out the scheme is £27,960.

**Limerick.**—The branch of the Christian Brothers' School situate in Quay Lane is undergoing an important change. Some time ago a movement was on foot for the commemoration of Gerald Griffin. It was then considered that the best thing to do would be to reconstruct and raise the school in question, it being a fine old cut-stone building, and standing on historic ground, facing St. Mary's Cathedral. It recalls the name of Rinuccini and the year of 1644, when the last great event occurred. The proposed work was placed in the hands of Mr. Joseph O'Malley, C.E., Glentworth Street, who furnished the plans, giving four additional class rooms, that raise the old building ten feet higher than it formerly stood. The new work is in accordance with the old style. A niche is provided in front for a statue of the poet and moralist. The nomenclature is, "The Gerald Griffin Memorial Schools." The expenditure is £2,000, and the contractor Mr. Patrick Kennedy, George Street.

A large addition has been made to the Condensed Milk Factory, North Strand.

At the Corporation meeting of Thursday, 15th, Mr. Peacock reported that he had been directed by the Public

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Health Committee to inform the Town Clerk that a large addition had been made to the Condensed Milk Factory, North Strand, so that it may be conveyed to the Valuation Office. A good deal of employment resulted, as it was carried out in massive stone work, the same as the rest of the great premises. There is also a dwelling-house to be erected on the North Strand, near the Militia Barracks, by Mr. Pike.

The premises of Messrs. F. Spaight and Sons has been almost entirely changed. The saw mill, which occupied part of the place, is removed to a new and commodious site on the Dock Road. Here also are established the box and cooperage works. The mercantile position on Henry Street and Bedford Row has now large warerooms, one of which, running in the direction of Shannon Street, is 130 feet long by 40 feet wide. Here are shown all descriptions of builders' ironmongery, together with sanitary and lavatory fittings. The showroom is lighted by eight large windows, and entered by ornamental gates of wrought iron, encased by a finely-designed archway in brickwork. The offices of the manager and clerical staffs are lighted by Lucas incandescent lamps, and the hot water pipe system is by Musgrave, of Belfast. The new works are from the designs of Mr. R. Fogerty, C.E., Henry Street, and the contractor was Mr. D. O'Sullivan.

**Midleton.**—At a meeting of the Urban Council a letter was read from the hon. secs. of the University Organising Committee, Cork, inviting the co-operation and support of the Midleton Urban Council for the purpose of affirming the necessity for obtaining satisfactory facilities for University education in Munster by the reconstitution of the Queen's College at Cork. Mr. Cuddigan referred to the desirability of establishing in the town a free library through the aid of a grant from Mr. Carnegie. The clerk was directed to communicate with those in charge of the Cork Free Public Library to ascertain the conditions and circumstances under which it was established, with a view to enabling the Council to see what would be the best steps to take for getting a free library for Midleton.

**Portaferry.**—Mr. Edward Byrne, of Portaferry, Co. Down, merchant, who died on August 23rd last, left personal estate in the United Kingdom of the value of £14,059 17s. 8d. Among his bequests was the residue of his estate (about £4,000) for the restoration, decoration, and improvement of the Catholic Church at Portaferry.

**Portrane.**—The Joint Committee of the Richmond District Lunatic Asylum have applied to the Local Government Board for Ireland for their consent to the borrowing by the Joint Committee of two thousand five hundred pounds (£2,500) for the purpose of providing additional house accommodation for the staff at Portrane Asylum.

**Reenasoreena.**—It is proposed to erect a new Catholic church, at an estimated cost of £2,000. The inhabitants of the seven townlands in that portion of the Roscarbery parish convenient to the site of the proposed church, have already subscribed £450 towards cost of erection.

**Strabane.**—The directors of the Strabane and Letterkenny Railway are prepared to receive tenders for the construction of passenger and goods stations along this line. The drawings, specifications, and measurers' quantities may be seen at the office of the engineer, Mr. James Barton, Exchange Buildings, Dundalk. Tenders must be sent upon the form which will be supplied to intending contractors, and must be with the secretary of the company, Mr. J. Gillespie, Londonderry, on or before December 3.

**The Tralee Town Hall.**—Mr. J. O'Connell, LL.D., solicitor, wrote, stating he has been instructed by Messrs. Kennedy Bros. to point out that owing to the great increase in the price of building materials and for labour since the contract was declared about twelve months ago, the contract price should now be increased in proportion. The extra outlay amounts to over £460. His clients are prepared to check present prices with the architect, and compare same with prices at date when contract was declared, and when orders would be placed in usual course, and they feel satisfied that after such comparison the architect will find that the above sum (£460) is an under-estimate. A few months ago carpenters' wages increased 10 per cent., and the working hours of all builders' employees had to be reduced recently by half an hour per day. (Comparative lists enclosed, as well as schedule showing increase of prices of materials.) On being declared contractors nearly a year ago, his clients understood that the work would be proceeded with at once, and they kept themselves in readiness, and refused all other contracts, amongst others, the erection of a spire in Castle-

island R.C. Church, new presbytery at Castlegregory, etc., etc. They procured a second yard and premises at a high temporary rent to enable them to carry out the work expeditiously, and in consequence of such loss of contracts, increased rent and taxes, etc., his clients has sustained a loss of over £300. Messrs. Kennedy Bros. applied verbally over and over again for permission to go on with the work. Prices are still on the increase, and unless the matter is decided and the £460 claimed allowed, they cannot undertake the work. Council's serious consideration is requested.

Note—Copy forwarded Local Government Board, who were requested to state whether the County Council could entertain this application.

From the Local Government Board, 9th November, intimating, as regards the question of allowing an increase in the amount of the tender already accepted for the erection of the county hall, that it appears to them that the matter is one for the decision of the Council, acting on the advice of their architect and solicitor. The tender in question appears to be accepted by the Council a year ago. The bond, however, has not been yet signed, nor the work commenced, and in these and other circumstances referred to this Board think the Council may properly allow the contractors such extra sum, beyond the amount of the accepted tender, as they may be advised by their architect to be reasonable on account of the rise in the cost of material and labour since the tender was accepted, if the Council, on a consideration of a report of their architect, are satisfied that no advantage would be gained by re-advertising for tenders. Should the Council decide on allowing an increase in the amount of the tender, the contractors' bond should at once be perfected. Dr. O'Connell appeared before the meeting in support of Messrs. Kennedy's claim, and in the course of an appeal pointed out that the next lower tender to Kennedy's was £700, so it could be seen that at that time he cut prices very fine. When the contract was declared he cleared out of the place where he was working in the site of the Town Hall, and was since paying £20 a year for a yard, with rates. They also refused since to take any large contract from outside, and didn't take any important contract in Tralee, thinking that they could commence the work, and they were now prepared to commence the work in a few days, and carry it out in accordance with the contract. He hoped they would see justice done to his clients. Mr. W. O'Donnell thought they should give some increase. Mr. J. O'Donnell went through the loss that Messrs. Kennedy had sustained, and proposed that they get a sum of £500. Mr. Donovan said some materials had increased by 40 per cent., but the average increase in materials was between 10 per cent. and 12 per cent. Dr. O'Connell said that 10 per cent. on the contract price would be £528. Mr. Bailly seconded Mr. O'Donnell that £500 be given, and after some remarks it was decided to pay this amount, provided the architect certified that the sum satisfied him, and any lesser sum to be given to the County Council.

It will be remembered that an architectural competition for this work was held last year, and as a result the design of one architect was placed first by Mr. Ashlin, the assessor, but the County Council adopted another design, which Mr. Ashlin warned them could not be carried out for the stipulated amount. A subsequent action at law by the architect whose design was placed first failed on technical grounds.

**Waterford.**—Considerable additions have been carried out at the Christian Brothers' Institute at Mount Sion. These include the rebuilding of the old chapel and the two schoolrooms underneath. The designs were prepared by Mr. Ryan, of Dublin, while the work was entrusted to Messrs. John Hearn and Son, of Waterford.

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# ENGINEERING SECTION.

## ITEMS.

The sittings of the Arterial Drainage Commission for the purpose of taking evidence have now concluded. On November 8th, 9th, and 10th, witnesses from Antrim, Armagh, and Londonderry were examined with special reference to the Bann area, and the final sittings in Dublin, at which witnesses from the South of Ireland attended, were held on November 19th, 20th, and 21st.

\* \* \* \*

The first sittings for hearing evidence were held early in January of this year, so that no time has been lost in dealing with the very intricate and conflicting views which this important subject has engendered. The report has now to be drafted, and as the Christmas vacation intervenes it is scarcely likely to become public property until the New Year has well advanced. Its issue will be anxiously awaited, not only for the technical details which it will contain, but also as to the recommendations for future control of the flooded areas and of the works necessary for their relief.

\* \* \* \*

The Corporation of Dublin, in its efforts to fill up the sloelands at Clontarf, is apparently about to meet with further opposition from those residents who state that their night's rest is disturbed by the continual passage of the refuse vans. These difficulties invariably occur when a public body undertakes a great work, and we doubt whether the Corporation engineers will have their rest disturbed by the thoughts of the claims for damages which are about to be laid. We have always questioned whether this process of refuse disposal can be described as sanitary, but as a decision to carry out the scheme has been arrived at, and much of the filling-in has already been executed, we hope that the work will be vigorously proceeded with, a result which continued opposition will scarcely promote.

\* \* \* \*

The extensive scheme for the construction of wharves and transit sheds at Greenhithe is now taking shape under the advice of Sir John Wolfe Barry. It is curious to note the apparent intention to erect the structures of timber, in spite of the warnings conveyed by the disastrous fires that have from time to time occurred in London and New York docks. In these days of concrete steel construction, which method has been found eminently suitable for wharves, jetties, and harbour works generally, a reversion to timber seems to be rather retrogressive, not only owing to danger from fire, but also to the injury that accrues from sea-worms and decay. It is rather surprising that an engineer of such eminence should allow his name to be associated with the proposals as they now stand.

\* \* \* \*

On the 16th inst. Mons. Mouchel delivered a most interesting and instructive lecture on ferro-concrete construction, at the Engineering School, Trinity College. By the courtesy of the College authorities, a number of representative architects and engineers were to be found amongst the large audience which assembled to hear a paper by such an acknowledged authority on Hennebique Construction as is Mons. Mouchel. Nor were they disappointed, for the difficulties of this technical subject were dealt with in a manner which made them easily digestible, and the views of structures in various stages of erection were almost self-explanatory. Unfortunately, the lantern provided gave considerable trouble, and during the evening completely struck, another having to be obtained. Such an occurrence betrayed some inattention to preparation for the paper, and must have considerably disconcerted the lecturer. However, the interval of waiting was, more or less, adequately filled by various speakers, and Mons. Mouchel enjoyed the experience of receiving a vote of thanks in the middle, instead of at the end, of his paper.

\* \* \* \*

It will be recollected that the third interim report of the Royal Commission on Sewage Disposal recommended the establishment of a central authority to act as referee, or arbitrator, in cases of dispute between manufacturers and local bodies arising out of the discharge of trade effluents into public sewers, a question which is always one of diffi-

culty to adjust. There are two principal methods of arrangement, and each has its own supporters. The manufacturers can either treat the effluent prior to its discharge into the public sewers, or a special charge can be made, and the manufacturers relieved from the responsibility of heating the effluent. The Police and Sanitary Committee recently reported to the House of Commons that steps should be immediately taken to give effect to the recommendation of the Royal Commission, issued in 1903, and consideration of ways and means will assuredly occur in the near future. Amongst the recommendations of the latter body was the suggestion that the central authority should be a sub-department under the Local Government Board, and that it should deal in addition with the prevention of water pollution. The whole of the proposals are of a far-reaching and weighty character, and, as they involve considerable expense, will require careful weighing before a definite scheme is decided upon.

\* \* \* \*

In a recent article on the staff of one of the chief Government Departments in this country, a contemporary pointed out the disparity between the Catholic and non-Catholic element, the latter in the architectural and engineering branches being five times greater than the former. The article was written on the assumption that a certain religious, as well as a technical, qualification is necessary to obtain an appointment. Upon such an assumption we do not wish to comment; to one who has any knowledge of things or who stays his pen to think, it carries its own refutation. But the article and the statistics therein, which are possibly true, would tend to show that some cogent reason must exist to account for the preponderance of the non-Catholic element. A possible solution may be found in perusing the membership roll of a leading Irish professional society, in the ranks of which it may reasonably be anticipated a fully qualified man will be found. Out of ninety-seven members only twenty-four are Catholics, and in a junior society, out of 117 members, only forty are Catholics. As entrance to these societies is certainly only based on professional qualifications, it is curious that the proportion is so dissimilar, approaching that alleged to exist amongst those officials against whom our contemporary tilts its lance.

\* \* \* \*

A proposal has lately been made that a conference should take place, in the near future, between the engineers and surveyors to the metropolitan borough councils and the manufacturers and proprietors of commercial motor vehicles. We understand that the main point of discussion will be the various difficulties in connection with road construction, repair, cleansing and maintenance, especially in relation to motor omnibus traffic; and it is confidently expected that the large towns throughout the United Kingdom will contribute data upon which a working basis may be arrived at. At present the whole question is in an indefinite condition. The ever-increasing number of motor vehicles is undoubtedly causing a heavier expenditure on the upkeep of the roads, and new roads will be more costly if designed to cope with this comparatively modern form of traffic. So far, it cannot be considered that the best form of road or of road surface has been arrived at, although experiments to that end are being conducted by energetic surveyors throughout the country. A round table conference will, doubtless, do much to further a settlement; at all events, it will help to still the wordy warfare of criticism which exists between those who use the roads and those who are responsible for their condition.

\* \* \* \*

Mr. William B. Bryan, M.Inst.C.E., the Chief Engineer to the Metropolitan Water Board, gave some instructive figures in his recent presidential address to the Junior Institution of Engineers. The subject, "Water Supply," afforded the speaker an opportunity, of which he fully availed himself, to deal with the history of this important matter from the Egyptian irrigation works down to the modern reservoirs at Thirlmere, Loch Katrine, and Vyrnwy, a survey which proved most interesting. Dealing more particularly with the London water service, Mr. Bryan stated the area of the limits of supply of the Metropolitan Water Board is about 537 square miles, the population



served numbering over 6½ millions. The average amount of water supplied per day in the year ending March 31st, 1906, was 218,000,000 gallons, or 32.3 gallons per head per day for all purposes. In the month of July, 1904, 258,000,000 gallons daily were supplied, and in July, 1905, 253,000,000 gallons. As an illustration of these figures, which are difficult by reason of their magnitude to comprehend, the water supplied in July, 1904, would have filled a canal 40 feet wide by 3 feet deep and 2,020 miles in length. In the same month the average daily weight of water pumped into the mains was 1,153,000 tons, or about three times the weight of the whole population supplied. The aggregate length of iron mains is about 6,000 miles, and the storage reservoirs have a total capacity of 7,415 million gallons, and an acreage of 1,309. In conclusion, the President stated that no hard and fast line can be drawn as to the daily quantity per inhabitant for domestic purposes. In villages where there is no water-carried system of sewerage, from 10 to 12 gallons is ample. In large towns where the water-carriage system is only partially used, from 12 to 15 gallons have proved to be sufficient, and from 12 to 18 gallons per head per day is found to be ample in very populous districts in which every house has its water-closet and where there are no restrictions on the supply.

\* \* \* \*

The Irish Railway Commission, after hearing a considerable amount of evidence, has adjourned until January. So far, witnesses have chiefly ventured the opinion that State-aided railways under the control of a popular council would best meet the needs of the situation. The railway companies may, however, congratulate themselves on the permission accorded them to be represented by counsel, as many of the statements made by the witnesses have badly withstood the ordeal of close examination. Despite this, there is no doubt that the opinion of the country is in favour of some change in the methods of railway administration, in order to reduce rates, facilitate transit, and aid the agricultural community. The point of divergence is how the improvement can best be attained, and the evidence which the Commission will collect, in the course of what will probably be a protracted enquiry, will doubtless enable some definite conclusion to be arrived at which will be acceptable to all but the extremists on both sides.

## ENGINEERING NEWS.

**Ballymoney.**—These waterworks, constructed over twenty years, have lately been giving trouble, and the Urban Council has engaged the services of Mr. J. H. H. Swiney, of Messrs. Swiney and Croasdaile, M.M. Inst. C.E., Belfast, to advise on the best means of improving or extending the supply.

**Ballymoney.**—At a meeting of this Urban Council with reference to the application of the Council for sanction to a loan of £500 for the purpose of enabling them to construct a service reservoir in connection with the water supply of the district, the Local Government Board wrote stating that they had received a communication from the chief engineering inspector, Mr. Cowan, from which it appeared that the main pipe from the reservoir was not in good order, and the water supply was consequently defective. They were of opinion that before proceeding further with the matter the Council should obtain the advice of a consulting engineer as to how the existing supply could be best improved, both in a permanent and an economical manner. After discussion the clerk was directed to find out the probable fee of a consulting engineer. With regard to several important improvements which the Council proposed to carry out in the town, a communication was received from Mr. Thomas M. Greer, solicitor, stating in reference to Henry Street that the usual practice was not to take over a roadway until it was properly constructed. The Council would not be justified in lighting the roadway until they had taken it over as a public street of the town. With respect to the Gas Company, so far as he could see they had no power to break open the streets of the town without the consent of the Urban Council. As to steam-rolling, the County Council had no power to borrow money to be expended in steam-rolling the main roads within the urban district, but they were prepared to pay one-half of the principal sum which might be borrowed for that purpose, not exceeding £300 in all, and also half the interest which might be charged. After discussion, the clerk was directed to apply for a loan of £300 from the Board of Works for steam-rolling.

**Castleblayney.**—The Urban Council will on the 17th inst. consider tenders for carrying out the new sewerage and water-works, which comprise the construction of a storage reservoir, filters, and clear water tank, the providing and laying of cast-iron pipes, the providing and fixing of fountains, hydrants, construction of sewers, manholes, septic tanks, and bacterial filters; the laying-out and preparing of land for irrigation purposes, and other works, according to plans and specifications prepared by Mr. Francis Bergin, Dublin.

**Cork.**—The Rural District Council invite tenders for laying sewers at Cat Lane, etc., Blackrock, according to plan and specification, which may be inspected at the office of the Clerk of Council. Tenders close on 6th inst.

**Ennis.**—The Local Government Board have refused to remit the surcharge of £24 10s. made by their auditor, Mr. Cyril E. Browne, against the chairman of the committee, Rev. A. Clancy, P.P., and Messrs. P. E. Moloney and James O'Regan, in respect of the payment made by the committee to their architect, Mr. F. O'Connor, C.E., for plans, etc., made in connection with a new sewerage scheme for the asylum. Mr. O'Connor had been appointed at certain scales of fees should the work be carried out or not, and the payment to the architect was on the higher scale, which was disallowed by the auditor. The committee considered that the amount ought to be refunded by the architect, who claims a further sum of £1,000 in connection with plans for the extension of the asylum buildings.

**Limerick.**—In the Chancery Division, before the Master of the Rolls, in a case of the Limerick Race Co., Ltd., v. Limerick No. 1 Rural District Council, Mr. J. F. Moriarty, K.C., said in this matter, which was an application for an interim injunction to prevent the District Council from proceeding with their drainage from their road drawn across the company's lands to the Ballinacurra River, an adjournment had been granted for the filing of an affidavit by defendants. No affidavit had been filed, but he understood defendants were willing not to do anything to interfere with the plaintiff's lands pending the hearing of the action. Mr. C. F. Doyle, K.C. (instructed by Mr. John Ryan), on behalf of the defendants, said they were willing to give the undertaking; but, of course, their drainage scheme, as a whole, would be proceeded with. The action, too, should be speeded. Mr. Moriarty said they were willing to speed the hearing. The undertaking was accordingly received.

**Meath.**—It is understood that Mr. J. H. Moore, vice-president of the Institution of Civil Engineers, Ireland, County Surveyor for Meath, intimated his intention of resigning office next June.

**Newtownards.**—Tenders are invited for the construction of a complete system of waterworks for Newtownards, for the Newtownards Urban District Council. The works comprise generally the driving of about 1,500 yards of tunnel through Scarbo Hill, the construction of a concrete reservoir of 2,000,000 gallons capacity in the townland of Ballycullen, the laying of an aqueduct and the various distributing pipes throughout the town, consisting of about 16,800 yards of cast-iron pipes, varying in diameter from 10 in. to 3 in., with the supply and fixing of all pipes, valves, meters, hydrants, specials, etc., the construction of a concrete reservoir of 100,000 gallons capacity, in the townland of Corporation North, and the providing and fixing of pumping engines with all necessary fittings. Plans and specifications may be seen, and a copy of the specification, form of tender, and bill of quantities can be obtained, upon payment of £1 1s. (which will not be returned), at the office of the engineers, Swiney and Croasdaile, M.M. Inst. C.E., Avenue Chambers, Belfast, on any week-day between 10 a.m. and 5 p.m., except on Saturday, when the office closes at 2 p.m. Tenders, endorsed "Tender for Waterworks," to be delivered in sealed envelopes at the office of Mr. H. M. Cartney, clerk, Town Hall, Newtownards, by 5 p.m. on December 10.

**Rathdown.**—The Rathdown District Council ask for tenders for a sewerage and road-making scheme for Kill-o'-the-Grange. Plans and specification by Mr. R. M. Butler, Dublin.

**Tandragee.**—At a meeting of the Urban Council Mr. Magennis proposed the following resolution:—"That we, the members of the Urban Council, having received a memorial from the inhabitants of Tandragee, do form ourselves into a committee in order to inquire into the cost of an economical and sufficient supply of good water for Tandragee, and engage expert advice thereon." Mr. John Fearon seconded, and the motion was passed unanimously.

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[CONCLUDED.]

### Sutton Courtney.

At Sutton Courtney, in Berkshire, is a house, built about the middle of the fourteenth century, in which the usual disposition of rooms is again found. The hall is entered at one end through the screens, and the roof is made to agree with the framing of the screen itself. At the lower end is a doorway which led to the kitchens; at the upper end is a wing which contained the solar on the first floor, reached by an external covered staircase. There is no bay window, but it is worthy of note that below the main window at the dais end is a low side window, probably contrived for the convenience of the occupants of the dais. In later times, while the hall windows were almost invariably high up from the floor, the bay window of the dais was equally invariably brought down low enough to afford an outlook. The lofty hall roof still remains (or remained when Turner and Parker wrote) and the general character

the two courts, thus being in the most central and best protected position. It was flanked, according to the usual custom, at one end by the buttery, pantry, and kitchen, and at the other by the family apartments, hitherto confined to the solar, but now developing into the parlour and other rooms, including a number of separate bedrooms. This plan of Haddon shows the great chamber and the long gallery, but it should be remembered that the great chamber was probably not so called prior to the sixteenth century, while the long gallery was contrived over the walls of a number of earlier rooms towards the close of that century. The kitchens here are much more elaborate than in any of the previous examples, and they go to show that the wants of a large household and a hospitable lord were both manifold and permanent, and not so liable as in ancient days to interruption from hostile visitors.

The possibility of such interruptions was never absent from the minds of the builders of those days. Houses were nearly always surrounded by a moat where the nature of the ground permitted it. The entrance gateways still followed in many cases the ancient fashion of placing an archway between two towers. The courtyard plan still held the field in houses of any pretensions. As the years went on the character of the ornament changed just as it



Kirby Hall.

of the work has led to the hall being called the chapel, another illustration of the widespread, but fallacious, notion that Gothic forms must of necessity indicate a religious edifice.

The hall itself was usually a lofty building, with an open timbered roof. It divided the house into separate halves, which, if they were of two storeys, had to have their own separate staircases. The walls of the hall were often plastered, and for ornament they were hung with the sports of the chase, or else:—

With pikes, guns, and bows,  
With old swords and bucklers that had borne many shrewd  
blows.

A good example is to be seen at Cothele, in Cornwall, and also at Haddon Hall, where the fifteenth century wood-screen still remains.

### Haddon—The Hall (XV. Century.)

Haddon is a fine example of a large fifteenth century house, built round two courts, and still exhibiting a considerable desire for defence. The hall, as was usual in the double-courted houses, was placed in a wing between

changed in churches. The tracing disappeared from the windows, which became flat-headed. Doorways likewise became less aspiring, and assumed the obtuse angle of the Tudors. Fan tracing made its appearance in various places, such as the ceilings of bay windows and porches. Circular stairs were placed in turrets, which were carried up above the main block of the building, and crowned with lead cupolas. The splendid brick chimneys of Henry VII. made their appearance, with all their intricacy of cut and moulded brickwork.

Then came the Italian influence which first made itself felt in unimportant ornament, and then spread to shaping the building itself, reducing it to symmetry so far as the exterior was concerned, but leaving the interior still to be arranged after the old fashion.

It brought also that exotic feature, the loggia or open arcade, which, however, never obtained a really firm footing in English houses. Indeed, all through the sixteenth century and the first quarter of the seventeenth, the new Italian influence never overmastered the old irregular English habits. But under the accomplished Inigo Jones, as we shall presently see, symmetry, which had hitherto been kept to the outside of the house, invaded the inside as well.

However much the character of the ornament may have

\* A paper read before the Architectural Association of Ireland.



varied, the character of the plan moved but slowly, and always in one direction. Haddon and Apethorpe, two large houses, have shown how the old type grew at its two ends, the hall remaining as of old, but the kitchen and the private apartments undergoing considerable increase and development. On a smaller scale Canons Ashby tells the same story. So do the plans of Elizabeth's time, such as Cannons on a small scale and Kirby on a large scale, both taken from Thorpe's book. In looking at these plans, it is obvious that the old idea is still the foundation of the arrangements, although, in a great place like Kirby, the accessory apartments have become vastly multiplied, and all thought of defence has been abandoned. Houses are no longer built for safety, but for show. Windows which once were sparingly introduced into the outside walls—that is, the walls looking out on to the country—are now used without restraint, and are regarded quite as much from the point of view of how they will help the composition of the design as from that of usefulness in lighting the rooms. Cheerfulness, splendour, comfort (of a kind),

chamber on the upper floor, and the long gallery, that feature peculiar to Elizabethan houses.

The finishing and embellishment of these rooms had developed along with their numbers. In the days of Henry III. we hear of plastered walls, and wainscotted walls and roof; but the rooms were extremely draughty, and the smoke from the central fires must have been almost intolerable. There was, indeed, no great inducement to abolish draughts so long as the smoke hung about the room. But the discomfort of draughts and smoke gradually told even on the iron constitutions of mediæval knights, and by degrees fireplaces with a special flue for the smoke grew more common, and the smaller rooms were furnished with them. Draughts were excluded by filling the windows with glass, and later by plastering the ceilings as well as the walls. Indeed, the ceilings were plastered more frequently than the walls, which were usually covered either with tapestry or with panelling. The plaster on the ceilings was not kept plain, as it usually is in our days, but was worked into an in-



Dingley Hall.

these are the qualities now sought after. The hall had long ceased to be used as a sleeping apartment. When the family and servants retired to rest it was left to Puck and the fairies, to Oberon and Titania and their train, who

Through the house give glimmering light  
By the dead and drowsy fire.

It was not always used even as an eating place, at least by the master and mistress and their family, for many families had already sought a smaller and snugger room for their meals, where they could enjoy more comfort and privacy. Not only had the ancient solar developed into the parlour, but the parlour had been developed into the summer parlour, the winter parlour, and the dining parlour. It was no longer on the upper floor, but close to the hall on the ground floor. It was no longer the only bedroom, for bedrooms had been indefinitely multiplied, and under the name of "lodging" fill up any space in old plans to which no more fitting name could be given. The solar had still further developed. In addition to the parlours on the ground floor, there had arisen the great

finite variety of ornamental patterns. Indeed, by the period at which our story has now arrived, the fitting up of rooms had reached a point of development beyond which we have not gone very far. We have introduced a number of refinements in detail, but with the exclusion of the weather, the furnishing of a means of heating, and the embellishment of the walls and ceiling, our ancestors of Elizabeth's time had really surmounted the chief difficulties of making an individual room pleasant. Its relation to the general scheme of the house is another matter.

Down to the end of the 16th century, and, indeed, as far as the first quarter of the 17th, the old type of house plan was still used—the old type which had prevailed in the days of the Norman Kings. It is true that the ancient idea had been greatly developed; the kitchen department had been so much enlarged as sometimes to require a court to itself. The single private room, the solar, had been multiplied into several parlours, the great chamber, the long gallery, and many "lodgings" or bedrooms. But the hall still remained the centre of household life, and the dais, which indicates its use as a living-room, is shown on nearly all the plans in Thorpe's book. This enormous

development of household convenience and comfort would, of course, have been impossible had the first idea of the builders been, as of old, to secure safety, but it was not, and as the certainty increased that a man need not depend upon his own efforts to preserve his security, but upon the public authorities, so he found more leisure to attend to his comfort, and for securing greater privacy for himself and the members of his household. The great hall began to feel the influence of this change. It had long ceased to be used as a sleeping apartment, and now it ceased to be used for meals. The family withdrew at one end, the servants at the other, and it became merely a vestibule. Concurrently with this change of use, there went a change of idea in planning. The symmetrical disposition of houses which the Italian influence produced demanded that the hall should be central. Long-established custom demanded an entrance at one end of the hall, in the "screens," which, therefore, could not be in the centre of the façade. There are a number of examples, both in Thorpe's plans and in actual houses, of how these difficulties were surmounted. But when the hall was no longer wanted as a living room, there was no longer need for the entrance to be in its old position at the end, and the imperious demands of symmetry were satisfied by placing the hall in the centre of the façade, and the entrance door in the centre of the hall. This point is curiously illustrated by comparing Thorpe's plan of Aston Hall with that of the house as built. Thorpe shows the door in the old-fashioned situation at the end. It was actually built in the centre, and the hall here definitely ceased to be a living room, and became a vestibule. This change is a momentous one. It brings us out of the mediæval idea into the modern.

But although at Aston the plan shows a new departure so far as the hall is concerned, it still follows the old lines in its general grouping, and so does the external appearance. The triumph of foreign fashions over native was, however, near at hand, and it was Inigo Jones who brought it about. At Raynham Hall the plan is no longer founded on the old type. The hall is not the chief apartment, with the family at one end and the servants at the other. The latter have descended into a basement, and the whole ground floor is occupied by family rooms. Traces of the old fashions remain in the projecting wings and in the gables with which they are roofed. But in Coleshill, another house of Inigo Jones, the foreign influence is even more marked; the plan is still more symmetrical; the elevations are still more classic. In neither house are the windows mullioned. They have sashes, and the change from mullions to sashes marks the final disappearance of the last traces of mediæval treatment.

The lesson in foreign fashions which Jones gave his countrymen were continued by Wren, and bettered by his successors in the 18th century. At Raynham and Coleshill one cannot help thinking that the snugginess of some is sacrificed to the demands of stateliness; but at Seaton Delaval, Keddlestone, and Stratton it is lost altogether, and the inhabitants of those great houses had daily to pay a penalty inflicted by grandeur. The component parts of the house are divided into separate blocks, with tiresome corridors of communication. The great houses of the 18th century make a brave show, but they exhibit a profound scorn for the small amenities of household life. They were built in an artificial age, and, like the huge wigs which their builders wore as an indispensable part of their costume, they were intended rather for the admiration of the beholder than the comfort of the owner.

But the pursuit of comfort, which was the propelling force in all the changes of domestic architecture which we have been tracing, although it was neglected by the great in the days of Anne and the Georges, was still followed by persons of humbler ambitions, and in the smaller houses of the 18th century there is much that is admirable.

Much skill and care was expended upon their internal embellishment, and the woodwork of that period is always worth our careful study. This is not the occasion upon which to enter on a minute description of the respects in which it differed from that of Elizabeth's time. This only need be said: that it followed the general tendency of domestic architecture in adopting largeness of scale and dropping minuteness of parts. One or two examples will be sufficient to indicate the change of treatment.

This long story must now come to an end. It has not dwelt much on details. It has rather sought to show by means of actual illustrations, as distinguished from mere assertions, that our domestic architecture has undergone a real process of evolution, and that it has reflected, as, indeed, one might suppose that it would, the habits and

wants of well-to-do English people. The feudal lord, surrounded by his retainers, was satisfied with one great room for his household, a small room for himself when he desired rest and privacy, and a place to cook his food; the more important added to these a chapel. These few rooms were securely placed behind a surrounding wall. The feudal lord's Elizabethan descendant was no longer concerned about the safety of his household. This had increased in number rather than diminished, and while the courtier of the Virgin Queen still kept the old hall of his forefathers, he added a vast array of rooms in one direction for his household, and in another for his great guests and their retinues. His descendant of Queen Anne's time no longer made even the pretence of living in the midst of his household. His servants were banished to a basement or a distant wing, and his chief concern was to have stately halls for the reception of his guests, after whose departure he and his family sought the seclusion of such rooms as were of a reasonable size. But just as these habits were of a slow growth, so the changes which they wrought in the houses were quite gradual. A continuous thread runs through the whole series from the Conqueror to the Georges, and the vast Palace of Blenheim can trace its origin back to the lonely little tower perched on the hill above the Peak Cavern at Castleton.

## REVIEW.

**Notes upon a Method of Drawing with Modern Appliances.** This treatise, written by Mr. W. F. Stanley, of the well-known firm of instrument makers, W. F. Stanley, and Company, Ltd., 4 and 5 Great Turnstile, Holborn, London, W.C., deals with a novel method of dealing with a large number of drawings which require constant referring to, devised by Mr. Stanley to save time and trouble. Only two boards are needed, and a single set of squares, etc., to enable the most complicated and exact set of details to be got out. This ease of handling is largely attained by the use of the Stanley-Howard combined drawing board and square, which are fitted with rapid acting clamps, which enable the square to be held rigidly in any position, while the hands are free. This interesting booklet, which is well worth perusal, will be sent on application.

## IMPORTS.

### PORT OF DUBLIN.

November 15.—Per Mermaid, from St. Malo, 85 tons slates, J. McFerran and Co.

November 19.—Per Thelma, from Fredrikstadt, 51,041 pcs. boards, 5,419 pcs. scantlings, 1,000 bdls. laths, to order.

November 20.—Per Mauve, from Bordeaux, 105,000 pcs. slates, T. Archer; per Pandora, from Bangor, 189 tons slates, Brooks, Thomas and Co., Ltd.; per Lochaber, from Liverpool, 250 tons slates, Wallace Bros., Ltd.

November 22.—Per Winga, from Göteborg, 3 cases glass, 584 pcs. redwood, 5,655 pcs. whitewood, 6,800 bdls. laths, 3,011 bdls. mouldings, to order.

November 23.—Per Lord Dufferin, from Baltimore, 53 tons roofing slates, 518 pcs. oak lumber, to order; per Elidir, from Newcastle, 400 tons cement, McNaughton and Co.

November 24.—Per Bangor, from Rochester, 345 tons cement, J. P. Corry and Co.; per Lady Martin, from London, 448 sacks cement, J. McFerran and Co.; a quantity of timber, to order.

November 26.—Per City of Cadiz, from Hamburg, 1,907 cakes asphalt, to order; per Auricula, from Dunkirk, 4 bags cement, to order; per Dinorwic, from London, 270 tons cement, T. and C. Martin, Ltd.

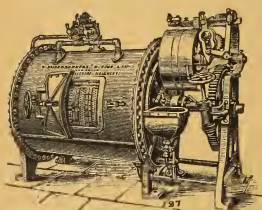
November 27.—Val de Travers, from Treport, 300 bags 8 cases plaster of Paris, 30 pks. stones.

The Sealburn Small Pox Hospital, Blaydon-on-Tyne, is being warmed and ventilated by means of Shorland's patent Manchester stoves and special inlet ventilators, the same being supplied by Messrs. E. H. Shorland and Brother, of Manchester.

**Enniskerry.**—The tender of Mr. Daniel Clarke, of Dublin, has been accepted by the Rathdown R.D.C. for the Enniskerry main drainage and sewage disposal works at £1,098, Mr. James being appointed clerk of works. There were four other tenders. Messrs. J. H. Ryan and R. M. Butler are the engineers.



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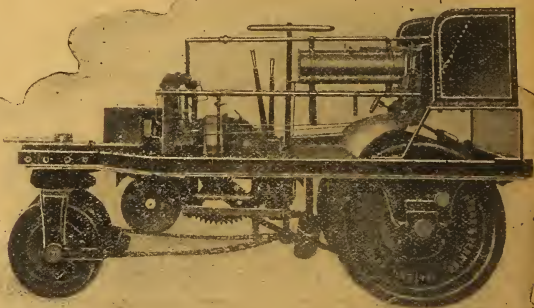
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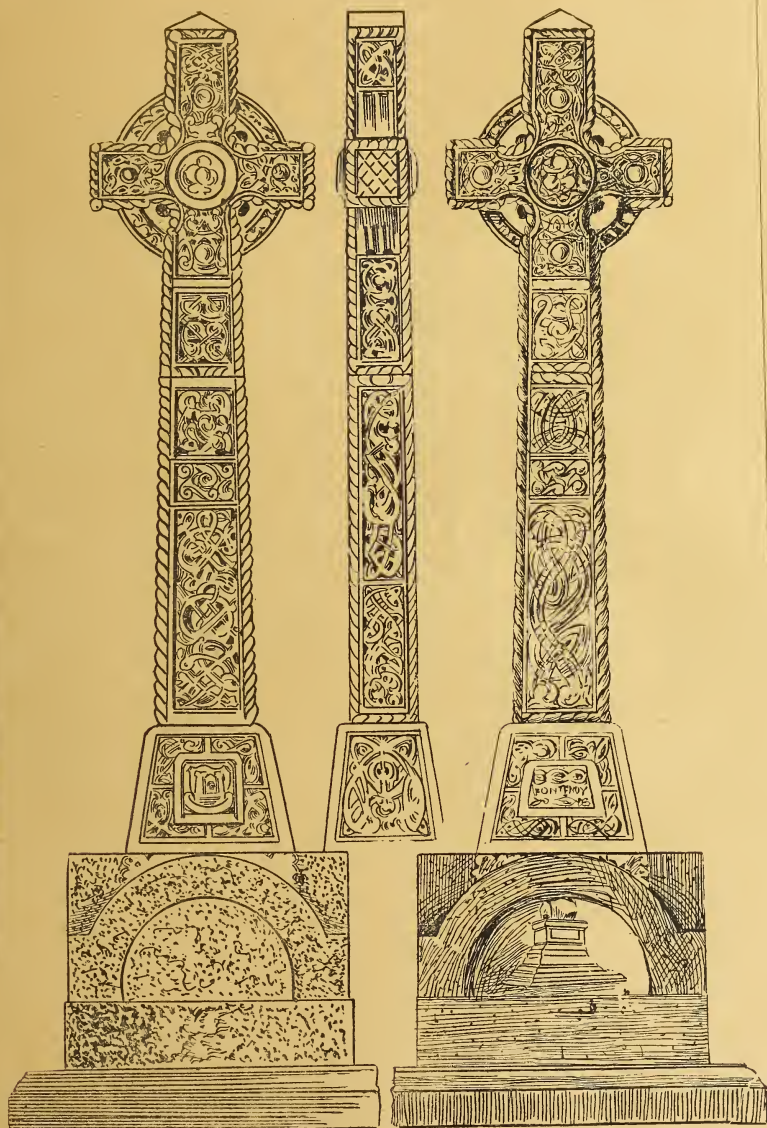
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## THE FONTENOY MEMORIAL.

Mr. Anthony Scott, of Messrs. A. Scott and Son, has completed the design of the Fontenoy Memorial Cross, which it is proposed to erect next year in commemoration of the great battle rendered famous by the achievements of the Irish Brigade.

is to be 4 feet 3 inches in height, and is to rest on a sub-base or step of polished Newry grey granite a foot high. The front, back, and two sides of the cross are to be filled with panels of the interlaced ornament peculiar to Ireland. Some of the designs for the ornament are taken from the old crosses scattered throughout the country, and others are



The Fontenoy Memorial.

The whole monument stands 19 feet 3 inches high. The height of the cross itself is 12 feet 3 inches, and the width across the arms is 4 feet. The die stone is 2 feet 3 inches in height. Both the die stone and the cross are to be of the very best and finest Kilkenny blue limestone, free from all imperfections. The base, of polished Galway red granite,

based on the ornaments found in the Book of Kells, the bosses between the arms of the cross, in particular, being adapted from some beautiful circular discs found in it. The whole effect is still further enriched by the cable mouldings carved around all the arrises of the cross. The interlacing in the panels, taken from the Book of Kells, is in-



geniously designed and skilfully executed. In two of the panels it consists of dragons and serpents, and in a third of birds treated in the same style as the interlacing work in the illuminated volume. One very handsome panel consists of re-entering trumpet spirals, beautifully grouped. These are after the model of the chief ornament of the Book of Durrow. Around the central boss, between the arms of the Cross in the front, is the only piece of work modern in style. It consists of floral decoration in the form of a wreath. The die stone is also filled with ornament. The word "Fontenoy" worked into an interlaced pattern is shown on the back panel, while in the corresponding panel at the front are the arms of Limerick. The base is designed so as to show a semi-circular arch on all the four sides. Three are recessed for inscriptions, and on the back is a representation of the Limerick Treaty Stone in low relief.

The work of executing the memorial has been entrusted to Messrs. Thompson Brothers, 30 Lower Dominick Street, and Nos. 1 to 4 Upper Dorset Street. They hope to have the work finished by the 1st of next July.

We are indebted to our contemporary, the "Evening Telegraph," Dublin, for the illustrations reproduced.

A cabinetmaker failed recently in London for liabilities amounting to £212 11s. 5d. His assets were 8d. ! It is not stated how this figure was made up—whether it included cash, outstanding debts, stock, or household furniture. If they had searched his pockets they might have got another few coppers for the creditors.

The Great Northern Railway of England are asking for tenders for 1,000 sup. ft. of 3 in., 3½ in., and 4 in. crabtree, which they say must be of best quality, thoroughly seasoned, and subject to inspection. It is expected that their next inquiry will be for gooseberry-bush scantlings, and that the tenders must be in before Tib's Eve.

An English technical journal, writing on the prospects of home-grown timber, points out that there is a good future in store for the quantities of larch and other timber growing in various parts of Ireland. It has hitherto been a difficult matter to dispose of Irish timber, however good, owing to the cost of transport from the woods to the English markets. Now, however, that foreign timber is becoming scarcer, and that home supplies are being eagerly sought out, the really excellent larch growing in this country must become valuable. Our contemporary does not counsel the sale of much at present, unless the woodlands are suffering from overcropping, for before very long the woods in every part of the United Kingdom will be ransacked for timber to meet the increasing demand. There is some fine oak in Ireland, but the larch, being free from the cankerous growth that has absolutely ruined the English woodlands, is the tree above all others which has a bright future in this island. Our contemporary wisely inculcates the planting of some of the barren areas of land with this highly remunerative crop.

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#### CONTRACTS.

#### CASTLEBLAYNEY URBAN COUNCIL.

#### CASTLEBLAYNEY SEWERAGE AND WATERWORKS.

The Council of the Castleblayney Urban District will, on Monday, the 17th December next, consider tenders for carrying out the above works, which comprise the construction of a storage Reservoir, Filters and Clear Water Tank, the providing and laying of Cast Iron Pipes, the providing and fixing of Fountains, Hydrants, construction of Sewers, Manholes, Septic Tanks, and Bacterial Filters; the laying out and preparing of land for irrigation purposes, and other works, according to Plans and Specifications prepared by Mr. Francis Bergin, B.E., 36 Westmoreland Street, Dublin, which can be seen at my office during ordinary office hours.

Tenders, accompanied by a schedule of prices, and containing the names and addresses of two solvent securities willing to join in a bond of £1,000, or a Guarantee Society bond for the same amount, for the due performance of the contract, will be received by me up to 12 o'clock noon on 17th December next. Tenders should be addressed to the presiding Chairman and endorsed "Tender for Castleblayney Sewerage and Waterworks," and no tender will be considered which is not on the proper form, to be had from the undersigned for a payment of One Pound, which will be returned on receipt of a bona-fide tender. As the Council have decided on joining the schemes in one contract, the aggregate amount in tender for sewerage and waterworks will be the deciding price.

The Contractor must pay all expenses in connection with the preparation and execution and stamp duty in contract and bond.

The Council do not bind themselves to accept the lowest or any tender.

By Order,

Brd. M'ARDLE,

Clerk of Council.

Courthouse, Castleblayney,  
6th November, 1906.

**THE DUBLIN PORT AND DOCKS BOARD** are prepared to receive Proposals to supply the undermentioned articles, from 1st January next to 31st December, 1907:—

Barrows.	Mineral Oils for Lighthouse.
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Securities will be required. The lowest Tender or any will not necessarily be accepted.

Preference will be given, after due regard to price and quality, to articles manufactured in Ireland.

Sealed Tenders, addressed to the undersigned, and endorsed on the outside, "Tenders for.....," naming the articles, will be received at this office up to Wednesday, the 12th day of December, 1906.

Forms of Proposal may be had at this Office, between the hours of 11 and 1 o'clock.

By Order,

N. PROUD, Secretary.

Port and Docks Office,  
Westmoreland Street, Dublin,  
15th November, 1906.

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No. 25—Vol. XLVIII.

HEAD OFFICE

DECEMBER 15, 1906.

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## TOPICAL TOUCHES.

At the last meeting of the Royal Institute of British Architects held in London, Mr. W. J. Fennell, F.R.S.A.I., of Belfast, and Mr. R. M. Butler, of Dublin, were elected Fellows of the Institute.

\* \* \* \* \*

We had a visit last week from Mr. Herbert Alexander, of Leeds, whose interesting paper on sand-brick making appears in our current issue. Mr. Alexander tells us that the sand-brick plant at Newry is now complete, and will be in operation in the course of next week.

\* \* \* \* \*

Having just returned from a visit to Germany, Mr. Alexander was able to give us some very interesting particulars regarding the development of the sand-brick industry in that country. The German clay brick is not so good an article as the English or Irish brick, and consequently the sand-brick has attained great popularity. Its use is insisted on by the Government building inspectors in connection with ferro-concrete constructions.

\* \* \* \* \*

In this issue we begin a series of articles by Mr. T. E. Hudman, M.R.I.A.I., Architect, on "The Industrial Resources of Ireland." It is now very many years since Kane's famous work with the same title was published, and became the leading authority on the subject. In it he set forth the resources of this country, foreshadowed many possibilities, and explained in masterly fashion the causes of failure. Fine classic as it is, it is now more or less out of date, so that we believe our readers will welcome a series of articles on similar lines, dealing with the same problems as they exist to-day. Mr. Hudman's well-known practical knowledge and close acquaintance with the building trade, while his habits of observation of such matters peculiarly fit him to write such a series of articles. The present revival of interest in Irish products and manufactures encourages us to believe that the series will be welcomed.

\* \* \* \* \*

Truly, the difficulties of municipal corporations are not few. No sooner than the Corporation of Dublin had assisted Lord Iveagh to build and equip a splendid market for the sale of old clothes, than they were beset with claims amounting to over a quarter of a million sterling on the part of street vendors whose avocations, it was alleged, had suffered disturbance by the change ordained. Then when the Corporation engaged in that highly meritorious work of filling up the filthy stob-lanes of Clontarf, the surrounding residents claim compensation! The latest case is that of the Bray Urban Council, who in 1899 acquired land in Little Bray for the purpose of building 45 much-needed cottages for artisans and labourers. Subsequently they decided, by omitting a certain play-ground originally provided for, to increase the scheme to 52 cottages. The former owners of the lands thereupon instituted proceedings to restrain the Council from deviating from the deposited plans on the grounds of injury to their adjoining property. Judge Barton, who heard the motion, dismissed it, and now the Court of Appeal has the matter in hands.

It is with great regret that we learn of the death of Mr. James Perry, M.A., M.E., County Surveyor of Galway. Mr. Perry, who was only 60 years of age, was a man of exceptional energy, ability, and business capacity, and in addition to the county surveyorship, and other public appointments which he held, enjoyed a very extensive and varied private practice. His death occurred at Galway, and was most unexpected. Mr. Perry was very well known throughout the West, and in engineering circles generally.

\* \* \* \* \*

Miss Perry, a daughter of the deceased gentleman, follows her father's profession, being the first lady engineering student ever entered on the books of the Queen's College—or, indeed, we believe, in any other college in the Kingdom, though the Misses Charles and at least one other lady in London are not alone members of both the English Institute of Architects and Architectural Association, but are engaged in active and, we understand, successful practice.

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Miss Perry was on Wednesday appointed County Surveyor of Galway *pro tem*, in succession to her father. She is a Graduate in Engineering of the Queen's College, Galway.

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The tender of Messrs. Martin and Co., of Dundalk, has been accepted by the North Dublin Rural District Council for the Howth Drainage Scheme, the amount of the tender being £6,698 9s. 2d., while Messrs. M'Kee and M'Nally, of Dungannon, were provisionally appointed by the same body as contractors for the water-works scheme at £6,683 17s. 7d., for which work there was a lower tender, amounting to £6,249 5s. 4d. The engineers for the former scheme are Messrs. M'Carthy and Anderson, and for the latter Messrs. Kaye-Parry, Ross and Hassard.

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Truly, the freaks of the rich are manifold and curious, to say the least, especially those of the American plutocrats. The latest freak is the £300,000 mansion now being built by Mrs. Clarence Moore at Washington, which (says the London "Daily Express") will contain 60 bathrooms. Mrs. Moore's private bath will be a work of art. It will be constructed in imitation of a cave with stalactites hanging from the roof; the tub will be a rose-coloured shell, and on the walls will be representations of aquatic plants. The floor will be covered with a rug in moss colour.

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Amidst the general depression prevailing throughout the building trade, the most notable feature is the marked rise in the price of all classes of building material. Timber, slates, iron, steel, copper, lead, glass, and bricks are all up. It is remarkable, too, that from Canada and the United States strong demands for iron continue to reach the Glasgow market, and promise, it is said, to bring about a regular famine in the Scotch iron market. Some of the makers have withdrawn their prices from the market, as they are booked for months ahead, and, in consequence of the urgency of the American demand, merchants are in a position to dictate terms.



## TOULOUSE AND THE MIDI.

## A SUMMER HOLIDAY.

By D. W. MORRIS, Surveyor.

[CONTINUED.]

Leaving Montrejeau, we pass Lannemezan, near which are marble quarries of varied and wonderful colours, and then comes Tarbes, the chief town of the department. Tarbes, the See of a Bishop, is a town of 25,000 inhabitants. Its importance dates from the middle ages, and it was occupied by the English for about 40 years in the 14th century. It suffered much during the religious wars of the 16th century. It has, of course, a Cathedral, not of much interest, and a statue to Larrey, Napoleon's great surgeon, who was a native of this department. It is a great horse mart, people coming from the mountains and from Spain to attend the fairs, where the finest horses in Europe are largely dealt in. A fine view of the Pyrenees can be had from here.

**The Chateau of Lourdes.**

The Chateau of Lourdes, standing on a high, isolated rock, is an ancient Roman Castle, later, a Carlovingian, Capetian, and English bastille; then a State prison, military hospital and barracks; and was finally acquired by the town, which, while waiting to establish a museum in it, has utilised its terraces for vulgar water reservoirs. Charlemagne fought and conquered a Saracen prince here, and it was the scene of much fighting from the XI. to the XVII. centuries. The English held it by treaty, and it was taken from them after two sieges in the time of Charles VI. Little more could be said of Lourdes, and it would have remained in obscurity, or been known merely as the junction for Caunterets, had not the young Soubirous

*Photo by]***The Bridge of Bordeaux.***[Maison Terpereau, Bordeaux.***Lourdes.**

Now comes Lourdes, and the first thing that catches our view on reaching the station are rows of invalid chairs. On alighting from the train, we are conscious of powerful disinfectants being about. Indeed, it does not smell at all nice, and our first impression was not an agreeable one. Our train being late, and the hotel omnibus having to wait for another train, we walked through the town to our hotel. Lourdes is distinctly disappointing at first. The smell in the station, the hilly, dirty, uninteresting streets, quite unlike the usual Pyrenean town, lead us to expect little; but, on approaching the river, we come suddenly in view of the Basilica, and the esplanade in front for processions; and, like a fairy scene, the whole changes, and one stands astonished at the prospect. You have in Lourdes, the old town, with its hill and castle on the east of the Gave de Pau, and on the west, the new town, the Lourdes of the Grotto. Let us say a word or two of the castle, and then speak of what has made Lourdes celebrated the whole world over—namely, the apparitions seen by the child, Bernadette Soubirous, in the early part of the year 1858, four years after the dogmatic definition of the Immaculate Conception by Pope Pius IX.

gone out on that February day to gather sticks for fuel for a poor household.

**The Churches of Lourdes.**

Faithful to the order of the Apparition, a beautiful Gothic Basilica has been built high over the river, and under it, the Byzantine Church of the Rosary. For four years, a Commission, instituted by the Bishop of Tarbes, inquired into the facts of the apparitions; and, on the 18th January, 1862, the Bishop declared these events supernatural, and authorised the devotion of the Grotto of Lourdes, and Popes Pius IX. and Leo XIII. approved of, and confirmed the action of the Bishop of Tarbes.

Since then, visitors and pilgrims to Lourdes have grown in numbers beyond all expectations. All nationalities and religions go there. On the evening which we spent watching a procession, we heard at least ten different languages, all joining in the Latin version of the Hymn of Lourdes. Masses are said in the various churches, and in the Grotto; at least 300 were offered from 5 to 11 o'clock the morning we were there.

**The Church of the Rosary.**

In front of the Basilica is the esplanade for processions,

an immense park planted with trees, almost surrounded by the river, and admirably arranged for the movements of the immense crowds which the great pilgrimages bring. At the entrance, are a fine statue of St. Michael, and the Breton Calvary 40 feet high, and in front of the Basilica is the great statue of the crowned Virgin, near which is a fountain. All these, as well as the churches, are lighted up by electricity on the evenings of processions; and, having seen them illuminated on a calm, clear, autumn night, we can say that the effect is most beautiful. Beyond the Virgin's statue is the Church of the Rosary, and winding gracefully round it are the two ramped approaches to the Basilica, which stands high above the esplanade. Under that on the right is a lofty arcade, through which you pass to the Grotto, and where you find, amongst other offices, the bureau of medical proofs and inquiries into the cures. The Church of the Rosary is Byzantine, inaugurated 1880, and built with a profusion of marbles. It is crowned with a cupola, not very graceful, which some think damages the fine perspective of the Basilica over it. This defect did not strike us much, but whatever is lost outside is made up for inside, as the interior is most effective. The chapels surrounding the church are ornamented with paintings, and when the whole inside is decorated the result will be very fine. There are two stone stairs, about 70 feet high, leading directly from the front of the Church of the Rosary to the crypt of the Basilica, from the façade of which a fine view can be had of the valley and the plain.

#### The Basilica.

The modern Basilica, of which Viollet le Duc says:—"It is a pearl of the Gothic style of the beginning of the XIII. century," was designed by Hippolyte Durand, and consecrated in 1876. In the crypt are several chapels, and cloisters for hearing confessions by confessors speaking all languages. It would be presumptuous for us to add anything to Viollet le Duc's eulogy. Every one knows what a great authority on mediæval Gothic he was. However, we may say, Durand's work is delightful. It has a coherence and impressiveness that are found only in the choicest works of art. Inside, everywhere, the walls are covered with votive offerings, priceless banners from the wide world, presents from emperors, kings, princes, military and naval officers—swords, epaulettes, decorations, orders, everything that, in the varied mind of man, could make beautiful or honour the place, and all arranged with a taste and an effect only to be found in France. High up on the clear-story is a green and gold banner from the Diocese of Clonfert, with the word "Ireland" spelt in neither the French nor English fashion. What a pity the inscription is not in Irish. The master altar is white marble, surrounded by most beautiful lustres and lamps, and by priceless statues. The windows of the clear-story tell in lovely stained glass the history of the Immaculate Conception. Those of the chapels, twenty-three in number, celebrate various scenes in the history of the pilgrimage. The pulpit, Canadian oak, was given by the City of Marseilles. The organ is by Cavaille Coll, a splendid instrument. Amongst the treasures are a monumental monstace, a diamond crown for the Virgin, and in a reliquary is the root of the Eglantine, on which the Virgin set foot at the moment of the apparition; also, a rich pastoral cross from Pius IX., and many other beautiful and valuable offerings.

#### The Grotto.

Passing under the arcade next the river, one arrives at the Grotto, where the apparitions took place. Here, also, is the miraculous spring where pilgrims drink and bathe. The Grotto is called of Massabielle, and is almost literally covered with crutches and all sorts of surgical appliances which pilgrims have left here. Candles burn day and night, and in the exact place where the Virgin is said to have appeared is a statue in white marble by Fabisch, of Lyons. This distinguished sculptor came to Lourdes to interview Bernadette. He was in great doubts as to this interview, as he expected to find an ignorant country child, who would help him but little in his artistic mission. He says himself, however, that when he asked her to pose as the

Virgin did, when she declared, "I am the Immaculate Conception," the child took a heavenly posture, which was a revelation. "So long as I live," he writes, "I shall not forget that ravishing expression. I have seen the *chefs d'oeuvre* of the greatest masters—Perugino, Raphael, and those who have excelled in rendering the ecstasy of Divine Love. In none of them have I found such sweetness and such perfection." When the statue arrived at Lourdes, Bernadette said simply:—"It is very beautiful, but it is not she. The difference is that of earth to heaven." Years afterwards, dissatisfied with all representations, she said—"If I only were an artist, and could produce what I have in my mind and memory!"

From the Grotto along the river an embankment has been made; and the buildings and works called into existence by the apparition may be said to be now finished and complete.

#### Pau.

Leaving Lourdes for Bayonne, we circle round the Basilica and the Grotto, getting a superb view of them, so that persons coming from this direction see Lourdes at once in all its glory, and not as we describe it on our arrival. At Bétharram is a pilgrimage dating from the Crusades, and a series of Romanesque chapels restored in the last century, which mark the Stations of the Cross. At Coaraze Henry IV. was brought up in the simple fashion of the peasants—barefooted and bareheaded. Pau is a town of 35,000 inhabitants, with magnificent hotels, and a famous winter resort, with a delicious climate, and on a beautiful site. It is the native place of Henry IV., the gay and gallant first monarch of the House of Bourbon, of Marshals Gassion, and Bernadotte, the latter being the only one of Napoleon the First's circle, who appears to have permanently benefited by the needless miseries that period brought on Europe. There is a 14th century castle here, restored in the last century, also the Church of St. James, an attractive modern building in the style of the 13th century Gothic, and a remarkably fine public garden. Pau has a pack of foxhounds, at one time hunted by the Earl of Howth. There is excellent trout fishing here, and everywhere in the Pyrenees; anyone who cares to cast a line may count on good sport in the numerous streams the glaciers send down fast, and sometimes furious.

Between Pau and Bayonne, there is nothing of special interest. You have, as everywhere, fertile plains, tilled and worked with French variety, intelligence and industry—and where can their like be found?

#### Bayonne.

Bayonne—a most interesting place—is largely populated by Basques and Spaniards, whose types, manners, language, and dress are in striking contrast with the other residents. The word Bayonne is Basque, and means Port. The bayonet is said to have been invented here. The Basques are a people out of relation to other Europeans. They are believed to be descended from the aboriginal race of Europe. St. Ignatius of Loyola, the founder of the Jesuits, and St. Francis Xavier, his illustrious disciple, were Basques. They are distinguished for their vigour, industry, and sobriety, their gaiety, frankness, and love of independence. They are splendid sailors. In Spain they fought gallantly for the Carlists, during these risings. In this, we think, they displayed their chivalry more than their good sense, as neither side was worth spilling one drop of an honest man's blood for. The ladies of Bayonne are very handsome, and dress with extreme good taste. On Sunday afternoon, on the Marina, may be seen much feminine beauty. The river Adour, which passes through Bayonne, is a fine river, and large steamers come up to its quays. Although not a lively place, Bayonne is interesting. The Bridge of the Holy Ghost, the Cathedral, and the New Port Street are worth notice. The latter is very quaint, owing to its shops with their low arcades in the Spanish or Italian fashion. The shops are excellent. There is a castle of the 12th and 15th centuries near the bridge, and at the end of the street referred to is the Cathedral, one of the most perfect minor 13th century cathedrals in France. It has two graceful modern spires. Inside, it is really beautiful. The windows are 15th and 17th century glass. To the south of the



Cathedral is a cloister, finished about 1240, one of the galleries of which is used as a chapel and sacristy. There is also a good modern marble high altar, a marble sanctuary pavement imitating an Oriental carpet, and several mural paintings. The fine south portal has some beautiful and well-preserved 13th century sculpture. Bonnat, the well-known painter, was a native of Bayonne.

#### Biarritz.

Biarritz, the celebrated watering-place, is five miles from Bayonne. Here are sun, sea breezes, style and fashion. There is practically no dead season. Except for two months, its palatial hotels and villas are crowded. It is delightfully situated on the Bay of Biscay, with a superb climate, much safer and more agreeable than even the azure coast, in so far as it is never chilly. Biarritz had its origin in the Carlist Wars, as the Spanish aristocracy were obliged to cross the frontier at that time in search of a summer resort, and amongst them was Mademoiselle de Montijo, who, when she came to the French throne, thought of Biarritz, and built a palace there out of the long purse of the people. During the French and Spanish season it is certainly a fine place to visit, and in a walk along the principal beach in front of the casinos, towards the end of August or beginning of September, you can see the cream of French and Spanish style and beauty. There are two

watering-places. At Hendaye you reach the frontier, which is the centre of the river, and at Irun, on the Spanish side, you change carriages for Madrid by the northern railway of Spain. In the centre of the Bidassoa is the Isle des Faisans, or de la Conférence—neutral territory. It is kept together by pitching and piles, and is the scene of the interview between Louis XIV. and Philip IV. It is also the meeting place of Louis XI. and Henry IV. of Castile. Near it, in 1526, ended the captivity of Francis I., and in 1615, Isabel, daughter of Henry IV., was exchanged for Anne of Austria, the former becoming wife of Philip IV., and the latter wife of Louis XIII.

The gauge of the Spanish railways is 5 ft. 6 in., the widest in Europe, the carriages being very large and roomy. Beyond this, nothing much can be said for the Spanish railways. They give no through or return tickets, and there is no hurry about them. An official crawls along outside the train, while it is in motion, to collect the tickets, and when you start out on a journey, no matter what distance, don't ask when you will arrive, as no one knows. In spite of all this, everybody seems happy and comfortable. The Custom House and octroi officials are very particular in Spain, so it is advisable not to bring in contraband goods, unless you declare them. It is also advisable to change your francs into pesetas, as the former are more valuable than the latter by about ten per cent.; that is, you get for



*Photo by]*

**The Grand Théâtre, Bordeaux.**

*[Maison Terpereau, Bordeaux.*

casinos, in which are to be found the usual distractions. They differ from the generality of casinos only by being more magnificent. The orchestral music to be heard here is unsurpassed of its sort. The bathing, which continues on to the end of September, is good shore bathing, made very pleasant by the big Atlantic rollers, which hardly ever cease. The sands are very fine; indeed, so smooth and flat are they, that they are used as a cycle track. There is a large bath establishment, to which the natural salt springs of Briscous are brought by pipes for a distance of 22 kilometres, and the treatment to be had is very successful. The town at night is very gay, after the fashionable dinner hour. There is good open-air singing at every café, and we think that, after an acquaintance with the leading French watering-places, we must readily award the palm to Biarritz. The restaurant of the casino where we dined, and where you get a splendid dinner, is a glass enclosure looking out over the bay, and could hardly be more delightfully situated. There are all sorts of sport here—races, pigeon shooting, carnival. At Bayonne you have bull fights, and also, of course, at San Sebastian, over the Spanish frontier, the arenas in both places being immense amphitheatres capable of holding thousands of spectators.

#### Spain.

Going south, and crossing the Bidassoa into Spain, the railway skirts the sea and passes a succession of pretty

a Louis something over 22 pesetas; and when you are leaving Spain, do not bring paper money, pesetas, or centimos with you.

Talking about railway gauges, we Irish, unfortunately, made ours too wide—viz., 5 ft. 3 in. That of England, and most of Europe, is 4 ft. 8½ in.; the United States is the same. We also made the few canals we have almost twice too wide. A 3 ft. 6 in. railway gauge would have suited us very well. If we had adopted this, and narrowed the canals by half, it would have saved sufficient funds to start Lord Dunraven's scheme of Devolution, or a splendid arterial drainage system.

Leaving Irun, by the appearance of the country it is easy to see you are not in France. The high cultivation ceases, or nearly so. The scattered houses are very picturesque, with their bright walls, low pitched roofs, and projecting eaves. You pass some fine land-locked harbours, and finally reach San Sebastian, after skirting an immense circular arena for bull fights, a place for playing "Pelote," a Basque game, and a large tobacco factory.

#### San Sebastian.

San Sebastian is one of the most beautifully situated watering-places in the world. It is absolutely protected on all sides with a superb circular beach, and has 38,000 inhabitants, being also the summer residence of the Spanish Court and aristocracy. In front of the railway station is an

elaborate bridge in reinforced concrete, and at the far end of the fine promenade de la Concha is the real Casa de Campo de Miramar, the Royal residence, a large villa in the English style. The Casino, near which is the Royal Yacht Club, is at the other end of la Concha. You have, of course, as in all Spanish towns, an alameda, with trees and a band stand, very much frequented, and lined with cafés. A typical Spanish church is the Santa Maria (1743), with three naves, having remarkable vaulted ceilings, and a tribune the whole width of the church. There is also the Church San Vincente, reconstructed in 1507. In the centre of the old town is the Plaza de la Constitution, surrounded by houses of similar character, with arcades and numbered balconies, for witnessing the bull fights which take place here.

One cannot quit San Sebastian without saying a word of its police force. Whatever put it into their heads, they are dressed like the London police, and are a signal instance of how ridiculous a people make themselves by copying another and a totally different type. The Spanish uniforms of soldiers, officers, Custom House, and octroi men are all picturesque—indeed, some of them are extremely beautiful, and the wearers look very gallant. The police are regular guys, exactly like stuffed policemen in a Gaiety pantomime. Their clothes are dirty, ill-fitting, down over their heels; their helmets are either too large, or too small; under them in most cases, is a beard of a week's growth; indeed, it makes one feel sorry to see such spectacles in gallant Spain. Probably they are recruited from the physical dregs of the population, the average Spaniard being too proud to take kindly to police duty. One thing stands to their credit, they are a very courteous force. Two of them were standing together, looking for all the world as if they were asleep, and necessary to each other for mutual support; and a big white steam-yacht was at anchor in the bay. Having awakened them by asking what was the yacht, they simultaneously answered, with the air of a grandee, that it was the Giralda, the King's yacht.

Leaving Bayonne, whose citadel has never been taken, and over the entrance of which is inscribed "Nunquam polluta," we wend our way north to Bordeaux, the fair capital of the Gironde.

(To be Concluded.)

## THE NEW CITY TECHNICAL SCHOOLS.

### Deputation of Architects.

After somewhat inexplicable delay, the Council of the Royal Institute of Architects, in response to the memorial of a number of its members in Dublin, appointed a deputation, which has at length waited upon the Corporation for the purpose of urging, on public grounds, the throwing open to competition, amongst architects resident in Dublin, the design for the new technical schools in Bolton Street, which it is at present proposed shall be prepared by the City Architect.

The deputation included—Mr. W. M. Mitchell, R.A.A., president; Sir Thomas Drew, P.R.H.A.; Messrs. W. Kaye-Parry, M.A.; A. E. Murray, A.R.H.A.; George P. Sheridan, A.R.I.B.A.; James H. Webb, M.R.I.B.A.; R. Caulfield Orpen, M.R.I.B.A.

Mr. Mitchell said the deputation which he had the honour to introduce represented the Council of the Royal Institute of the Architects of Ireland, and their object was to advance some reasons why the Corporation should reconsider a resolution already adopted by the Council placing the preparation of the plans for the new Dublin Technical Schools in the hands of Mr. C. H. McCarthy, the City Architect. They wished the Council distinctly to understand that they had no personal objection to Mr. McCarthy whatever in this matter (hear, hear). So far from that being so they all regarded him as a valued colleague, who discharged the duties of his onerous office with invariable courtesy and tact, and whose kindly assistance and advice had often been very helpful to them when submitting the designs of their buildings to his judgment (hear, hear). They were naturally, therefore, actuated by nothing but the friendliest feelings towards him, and which he believed Mr. McCarthy reciprocated. It was altogether on public grounds that they deprecate the employment of an official, no matter how eminent he may be, to design a building of the importance of these Technical Schools—a building which would rank as one of the leading edifices which had been erected in their city for many years, and which would therefore, leave its impress for better or for worse upon its

architecture. To render such a building worthy of the capital, no effort should be spared to secure the services of the best artistic Irish talent which could be procured, and also to utilise in its construction such native materials as are suitable in preference to imported articles. The buildings of this description which he had seen in England were, for the most part, handsome edifices, which, while answering their purpose admirably, helped to beautify the town in which they stand. Indeed, they need go no further afield than Belfast to see a technical school building which, among the secular edifices of that city, ranked second only to the magnificent City Hall recently completed there (hear, hear). The only argument which they had seen put forward against the employment of an outside architect, namely, that the fees of the latter might be saved, would not bear examination. If a superior design could be produced by competition or otherwise, they considered the Corporation was morally bound to adopt it, so as to maintain the high standard of the architecture of the city, and, therefore, that the question of the fees should not be taken into consideration. The City Architect, in the midst of the stress and strain of his arduous daily tasks, had little time at his disposal to think out a design involving so many problems as the new schools would confront him with, or to design an exterior which shall hold its own amid the many fine edifices with which Dublin abounds. If such a spirit of utilitarianism had prevailed among their forefathers, their city would present a very different appearance to what it does to-day, artistic design would have been banished, and the ugly and commonplace would have reigned supreme. Besides these considerations it should not be forgotten that architects paid rents and taxes like other citizens, and should not be deprived of their means of livelihood. In conclusion he ventured to bring under notice that this subject, under the heading of "The execution of important Government and municipal architectural works by salaried officials," was fully discussed at the recent International Congress of Architects, held in London last July. Herr Otto Wagner, of Vienna, said—

"Still another important factor comes into consideration. The architect appointed to an office will, while occupying it, certainly not play the leading part. His individuality, his taste, etc., must therefore subordinate themselves to the same qualities in his superiors. The works carried out under the supervision of the office would therefore not show the capacities, the taste, and individuality of the creating artist, but certainly the less valuable ones of his superiors, and as such superiors in most cases are laymen in questions of art, it will be hardly necessary to give any more reasons why from such a combination no good can come."

And again:—

"But Municipal and State administrations have certainly the sacred duty of cultivating the fine arts, which means, with regard to architecture, that the buildings erected by them should exercise the effects of models. But buildings of such a description can only be expected from great artists and not from officials."

Again, the Central Society of Architecture of Belgium were of opinion that no advantage could result from the execution of public buildings by salaried officials, and a resolution embodying those views was afterwards adopted by the Congress.

Sir Thomas Drew, P.R.H.A., said he only desired to say one or two words. He had always taken the very keenest interest in the welfare mainly of their city, and he must say that however much the Corporation had been criticised they had always taken a large and generous view in endeavouring to preserve and add to the artistic completeness of the metropolis (hear, hear). That was certainly his experience during the past 40 years, and he thought that the Corporation should now take a large view of the subject and endeavour to get the best architectural result that was possible.

Mr. Albert E. Murray and Mr. Kaye-Parry having spoken, the Lord Mayor promised that the views of the deputation should receive full and careful consideration. The deputation then withdrew. We trust that the effort made will bear good fruit and result in a well-arranged and impartial competition open to all Irish architects, though we confess, we fear that the Institute is a little late; however, "better late than never," and even if it is well that the present instance is not attained, yet it is well that there Corporation and the public should at least know that there exists in Ireland a representative Institute of Architects, and a body which takes an intelligent interest in promoting the artistic side of the city's life, a body to which the Corporation and other public departments might, with advantage to themselves and those whom they represent, appeal for advice in such matters.



## THE INDUSTRIAL RESOURCES OF IRELAND.

BY T. E. HUDMAN.

(Special to the "Irish Builder and Engineer.")

## I.—Introduction.

The remarkable book by Sir Robert Kane upon the above subject is one that well repays study, and, although it was written some seventy years ago, it is now, in these days, a very reliable guide for anyone wishing for information upon this important subject. It is very noteworthy that in this country there appears to be an ebb and flow in public enthusiasm about manufactures, occurring at regular intervals of 50 years. The first was about the middle of the eighteenth century, then again at the end of the century, when so many mills were established throughout the country, the overthrow of which is too sorrowful and well-known a story to enter upon here. The next period was about 1844, again to be nipped in the bud by the awful visitation of famine; and now we have another return of the industrial mood, and let us hope that it will not, like its predecessors, pass away without permanent effect.

## Past Efforts.

In looking back upon the many efforts that have been made to establish industries in Ireland, and especially those which are based upon the development of the mineral and other resources of the country, it is astonishing how few of them have survived—even though the craftsmanship and material were alike good—glass, pottery, ironwork, tanning, cotton, woollens, and many others. Some, of course, owe their downfall to gross injustice on the part of England, others to the discovery of more abundant and cheaper raw products in other countries, but this latter cause has told against England equally with ourselves. Also, it is asserted, that the owners of the soil, where minerals were concerned, were too greedy in exacting toll in the form of rent and royalties, and also that carriage of goods by rail and canal cost too much. These assertions are doubtless true, but they are also true of England; they may, and doubtless were, factors in the case, but we must look for other causes.

One of these is that in times of depression and the cheapening of products by the introduction of foreign and cheaper raw material, there has been no serious endeavour to persevere to the end and follow in the new track until success comes, and there has been the fatal habit of the children becoming too proud to work at the manufacture established by their fathers. There are numberless instances of sound concerns being ruined simply by several families drawing large incomes without giving the equivalent of work, and it is our belief that had this pernicious habit not prevailed many hundreds of manufacturing businesses would be flourishing to-day, giving employment to thousands, who are now citizens of other countries. Even to-day our monied people have no faith in business—in witness, look at the millions locked up in the banks on deposit, and bearing only a small rate of interest. And this habit of locking up the money at small interest for safety has become so ingrained that it is hopeless to expect a change for a long time. At the same time, so long as this "close-fistedness" with regard to money prevails, alongside with a general inclination to crowd into the professions and neglect the trades, we cannot consistently cavil if we find the foreigner taking advantage of our aloofness and reaping the reward that might be ours.

## Causes of Failure.

Failures in the past have been attributed to many causes—rapacity of landlords, iniquitous laws, combinations of workmen, and lack of skill, are amongst those prominently put forward by most writers in the past—but outside those industries deliberately killed by Parliamentary interference, the greatest loss has been caused by lack of enterprise and high charges. A modern instance of the latter came under the writer's notice recently. A contractor was executing some work at Limerick, and he found that he could have bricks delivered in Limerick from Youghal at a less cost than he could obtain them from the local brickworks. A similar instance occurred at Waterford; bricks

were brought from Belfast at less cost than the local bricks. On the contrary, there are numberless instances of industries being crippled because of the excessive rates charged by railway companies. But, still, it cannot be lost sight of that lack of enterprise and push, and the general slackness of personal supervision and personal enthusiasm on the part of the owner is a very general cause of decay of Irish manufacture. To talk "shop" out of business hours is tabooed, but if a man is interested in his work, and desires to put his best into it, the subject he likes to talk about most is that work and the various processes and the latest inventions for its improvement, and the interchange of ideas with kindred spirits is a great pleasure, and frequently profitable. This feeling, aided by a splendid system of education, is one of the secrets of America's and Germany's success. It is a liberal education to talk to an American or German manufacturer, and to listen to the enthusiastic way he will tell you about his manufactures, and in listening you learn how he knows it from basement to attic, and can direct it personally without being entirely dependent upon his foreman or manager, as is so frequently the case here.

## The Kind of Education Needed.

So far as education is concerned, we seem at last to be waking up to the fact of its necessity, and we are muddling along more or less upon the right lines. But our present system of technical education attempts too much, and is turning out "jacks-of-all-trades." What we want is a system of properly constituted Trades Schools, for now that the old-fashioned system of learning a trade by apprenticeship is becoming obsolete, it is hopeless to expect expert workers from the system of education obtaining in Technical Schools, and to expect to create them by working as boys or girls in factories is equally hopeless. There is no time in those hurried machinery days to teach, no opportunity to learn, and boys and girls grow up to be mere automatic assistants to the machines they tend. What we want is a system of organised Trades Schools, fully equipped with the latest implements and skilled practical teachers, so that pupils can be thoroughly grounded in every detail of the trade they intend to follow, and that they may be of great use, these schools should be under the management of a representative committee, composed of men elected by the masters and the various trade societies, and, to ensure efficiency at the end of the course of training, each pupil should take out a certificate setting forth his standing. If it was first-class, he or she could then command wages equal to ability, with no limit except that which economies compel, and the result would be the gradual creation of first-class craftsmen creditable to the country, and the elimination of the waster, the curse of all craftsmanship. Efficiency should be our cry.

Of course, these remarks apply more particularly to the building trades, although they have application to most trades where practical training and dexterity are concerned. One point, however, will have to be overcome before anything permanent can result, and that is the senseless rule of some trade societies which prevents any other than the sons or relatives of its members from becoming working members of their craft. In future papers we will endeavour to deal with the various materials that are found in this country, and the manufactures that might be developed from them.

(To be continued.)

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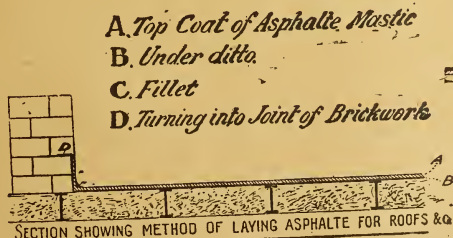
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## THE REPORT OF THE ROYAL HIBERNIAN ACADEMY COMMISSION.

When, many long months since, the late Government announced the appointment of a Royal Commission to enquire into and report upon the present state of art education in Ireland, and to suggest steps most calculated to further its development in this country, there was universal jubilation, not merely amongst professional painters and sculptors, the Royal Hibernian Academy, and others directly or indirectly connected with art in Ireland, but also amongst the great body of those who, themselves not artists, either professional or amateur, are yet sufficiently cultured to realise how great a part art has in a country's history, to what an extent it may soften and mitigate the harder realities of life, and dilute the materialism of a purely utilitarian age. Amongst such we may safely include every man and woman possessed of a moderate degree of education and culture. The constitution of the Commission of Reference, if it did not inspire wild enthusiasm—for it did not include a single painter, sculptor, architect, engraver, or other whose personal life's work closely identified him with art—yet raised hopes—possibly to an uncalled-for extent. The Commissioners appointed were—the Earl of Westmeath, the Earl of Plymouth, the Chairman of the Board of Works, Mr. George Holmes, Mr. Justice Madden, and Mr. P. J. Boland, M.P. With the single exception of Mr. Boland, none of these noblemen and gentlemen had ever publicly displayed any marked interest in art, or art education, and yet all were men of culture and refinement, acquainted with the needs of the country, to some extent at least, and a buoyant feeling of hope was not altogether unwarranted by the occasion. The Commission sat, and took much representative evidence

As was to be expected, the main point of testimony was the starved, neglected Hibernian Academy, founded by private benevolence, and maintained by its members on the most meagre of pittances from the Treasury, not sufficient to pay an adequate salary to a keeper of the Academy House. Through good and ill fortune, mostly ill, the Academy has, during many generations of contempt and indifference on the part of the Government and the imitative general public, striven to do its duty to art and to the country. It was proved to demonstration in evidence that Ireland, as compared with Scotland, was badly and invidiously treated, that the main cause of the poverty and failure of the Academy Schools was want of means to pay teachers and to provide prizes, scholarships, travelling bursaries, and other necessary inducements to encourage students, and to enable them to complete and perfect their studies abroad in the great centres of art teaching. All these facts are well known, and have been oft reiterated in our own and the columns of the general Press. Another subject of reference to the Commission was the state of the Metropolitan School of Art in Kildare Street, an institution which has, also for many generations, done the most admirable work in its own sphere of usefulness, namely, that of preparatory art education, and has laid the groundwork for many good artists, workers in the cognate and allied art handicrafts, and the youth of the country generally. But it is not, and never was, a school of painting, sculpture, or architecture in the true sense of the word—and whatever it may have once been, has of late more and more become a school for the study of freehand and geometrical drawing, and the other elements of arts and handicrafts.

The Commissioners heard the evidence, and after much weighty and prolonged consideration has at long last issued its report, happily, not an unanimous one. The majority report, signed by the Earl of Westmeath, Mr. George Holmes, and Earl of Plymouth, makes sweeping recommendations, amounting to the total abolition of the teaching functions of the Academy, and the transference thereof to the Metropolitan School of Art, henceforth to be dubbed "The Royal College of Art!" under the auspices of all other bodies in Ireland, the "Department"—"The Department of Agriculture and Technical Education in Ireland!" Could blundering incapacity and total lack of grasp of the subject under consideration go further? "The Department!" Why not the College of Surgeons, the Royal Veterinary College, or the Incorporated Law Society, or if it must be a Governmental Board, why not the Estates Commissioners, of whose energy so much is heard at the present moment, any one of which bodies would be at least as well suited for the office of supervision as the particular department selected, and some of whom, the surgeons, for instance, much as they might from force of habit incline towards amputation and the use of the knife, would in all probability, being themselves professional men, be sympathetically inclined towards a body of artists. The "Department," overburdened in its own proper sphere of work, has not earned universal or golden approbation, and in matters pertaining to agriculture, has, amongst a certain section of the community, rightly or wrongly, gained a reputation for ill-considered experiment and general ineptitude. To this body, then, which does not number amongst its members or employees a single professional painter, architect or sculptor (four School of Art masters alone excepted), it is seriously proposed to commit the whole future of art education, and, incidentally, of art in Ireland! A more deplorable and fatuous proposal we have never heard. Art, in itself a delicate plant, not easily to be reared amidst the uproar of political turmoil, or commercial unrest, is to be handed over, body and soul, to "the Department" to work its will on. The proposal! would be supremely ridiculous were it not so sad and

so fraught with peril to the interests of art in Ireland. The reasons put forward for this monstrous proposal are few and weak, needless to say, devoid of argument, and not capable of bearing calm investigation in the light of day. They are briefly: that the life classes and the general educational programme of the Academy, not having attracted vigorous support, let them be transferred to the Department. The Department of Agriculture will take care of art in Ireland in future. The claims of the Academy for help to discharge its public functions, to maintain and transfer to more suitable premises its sphere of operations, is ignored, or, rather, put off with a stupid and irrelevant suggestion to cure the Academy of all its troubles by reducing the number of its members, abolishing its schools, and returning such students as it still boasts to the Metropolitan School of Art, whence many of them emanated years before, and, finally, as a masterpiece of policy, to execute a few jobbing repairs to the structure in Lower Abbey Street. Happily, as we have said, this is not an unanimous report, and is opposed by a more intelligent and statesmanlike recommendation, signed by a minority composed of Mr. Justice Madden and Mr. P. J. Boland, M.P., who strongly protest against the majority report and its conclusions. Their own proposal is to fitly equip and foster the Hibernian Academy, the only representative art institution in the country, by properly housing it near the National Gallery, and giving it the wherewithal to adequately pursue its functions of educating and bringing forward the embryo artists of the country, and binding together its painters, sculptors and architects in a body. The minority report makes the proposal, of which we think we may venture to claim to have been amongst the earliest advocates, namely, the important one of founding scholarships, the holders of which would be enabled to complete their artistic studies in such centres of art as Florence, Paris, Dusseldorf, or Munich, and so on.

That any responsible Government would dream of adopting the absurd proposals of the majority report is inconceivable; still it is useful and appropriate that the Academy should summon a meeting of protest, the result of which we trust will be to give its quietus to the proposals.

We suggest that, in addition, the Institute of Architects, a body represented on the Council of the Academy, should make separate protest. Architects are—or should be—artists, but the profession in our day tends somewhat towards being drawn away from the art side of its calling, and towards the commercial and purely utilitarian aspect. The maintenance of a strong and vigorous artistic element of kindred aims, is a powerful adjunct in resisting the inroads of materialism, which to a large extent threatens to engulf architecture in this country.

The Commission has proved a failure, a dead failure, and has covered itself with ridicule. The worst feature displayed is the incapacity to understand even the nature of art, and the attempt to degrade it to the position of some whimsical branch of education taught as an extra subject at a technical school.

The adoption of the majority report would kill art for many a long day to come in Ireland.

Recently there came under our notice some splendid specimens of small, strong, rough slates from the Victoria, Carrick-on-Suir quarries. They were of splendid quality, and one of the slates had been drilled all over its surface with holes about one inch apart, without fracturing the slate. With such slate in the country there is little need to go abroad for our supplies.

## COMMENTS.

### Certificates and Orders for Extras Countersigned by Employer.

A case of considerable importance to architects and to builders was decided in the High Court in Dublin the week before last. It was an action taken by Messrs. M'Loughlin and Harvey, contractors, against a Kingstown merchant named Harten to recover a sum alleged to be due on foot of a contract and extras which they had carried out for the defendant, and for which his architect, Mr. T. J. MacNamara, of Dublin, had certified. The defendant repudiated the certificate, and relied upon a clause in the contract, which stipulated that orders and certificates should be countersigned by the employer, which provision had not been carried out in the present case. He also instituted an action for negligence against the architect. The result of the trial was, as recorded elsewhere in our columns, that the defendant failed to establish his point, the plaintiffs won their case, and the action against the architect was withdrawn. With the merits of the particular dispute we are not presently concerned, nor can we deal, as we have not before us a verbatim report of the trial; but the result seems to make still clearer than before an important point—namely, the validity of the architect's certificate under almost all circumstances. Here was a case in which it was expressly stipulated that no certificate or order should be issued without being countersigned; yet, in the absence of this, the Court, nevertheless, allowed the case to go to the jury, who found in favour of the plaintiffs, as stated. In other words, unless fraud could be proved against the architect, his certificate must hold good, even lacking as it did what at first sight would appear an essential endorsement expressly provided for in the contract. What does this mean? Without presuming to propound the mysteries of the law, it would appear on investigation to be a simpler question than it seemed to be. The contract provided for the countersigning, and the employer doubtless would have his remedy against the architect for a breach of agreement if he issued certificates contrary to the contract, but that would not operate against the plaintiff, who, in the opinion of the defendant's architect, as he certified in writing, had done the work and was entitled to be paid for it, and that was an end of the matter between those two parties. To set aside the certificate would necessitate clear proof of legal fraud and collusion between the architect and the contractor, while as between the employer and his architect the withdrawal of the action against the latter seems to once again show the almost impossibility of proving legal fraud and collusion against an architect. The presumption then remains, in the absence of such proof, that the architect acted bona fide, and that, therefore, his certificate must be upheld. This, at least, is our reading of the decision as from a layman's point of view.

To some, this line of reasoning, and the decision resulting therefrom, may appear peculiar, but there is another point from which such a case must be looked at. It is this:—Suppose the clause relating to countersigning were upheld as a legal bar to the contractor's right of recovery, and the certificate held to be invalid, we should have this state of things:—An employer has, in nine cases out of ten, a perfect answer to any claim by a builder if he can plead that the builder does not hold the architect's certificate for the amount claimed. Therefore, if his (the employer's) signature be essential, then by withholding that endorsement he could practically prevent a contractor from ever being paid on the contract. If this were the law, then the builder would have practically to abandon his rights under the contract, and seek to recover by some other round-



about legal process for work done, and this would be neither common-sense nor justice; so, after all, the law is not quite such "a hass" as is sometimes supposed.

### The Late Sir Edward Reed.

A very remarkable engineer and naval architect has passed away in the person of Sir Edward Reed, formerly Chief Constructor to the British Navy, and ex-M.P. for Cardiff. He occupied the office of chief constructor for many years, and sat as Liberal member, first for Pembroke, and subsequently for Cardiff, with brief intervals from 1863 until the last General Election. Sir Edward was a Fellow of the Royal Society, Vice-President of the Institute of Naval Architects, and Member of the Institute of Civil Engineers and of the Institute of Mechanical Engineers. He was a Knight of St. Stanislaus of Russia, of the Rising Sun of Japan, and one of the Mejidie and Commander of the Order of Francis Joseph, of Austria. He advocated the construction of a tubular railway across the bed of the English Channel as an alternative to Sir E. Watkins' scheme. During his time of office at the Admiralty he saw, and to a great extent initiated, the evolution of the modern battleship and cruiser as we know them nowadays. When he entered on his career a battleship was a vastly different affair to the floating fortress that we know, with its powerful and speedy weapons of destruction, turbine engines, torpedoes, steel-plating, electrical ammunition hoists and steering gear, and refrigerating plant, to mention but a few of the modern innovations. Sir Edward Reed had reached the age of 76 at the time of his death.

### CORRESPONDENCE.

#### Prize Plans for Irish Labourers' Cottages.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—Now that these are being prepared, it may, perhaps, interest some of your readers to hear the views of one, who, though not in the profession, has had a good deal of experience of erecting these, and has given the subject much attention.

The primary need of human existence is fresh air, and everything should be done to secure as free a supply as possible, and windows should be made to open *conveniently* in all weathers. As sunlight is also a great foe of disease, and as darkness and dirt are inseparable, the windows should be large.

Casement windows should be prohibited by law, for no one should sleep in any bedroom the windows of which are not more or less open all night; the more the better. Now, casement windows cannot be opened in windy or wet weather. Unless people can always open their windows more or less, they will rarely open them. If they must put up with bad air, on wet nights, they will make it do on fine ones. It is too much to expect a working man to get up in the middle of the night if the wind rises to shut his bedroom window. He will take care next night that he is not so disturbed.

Ireland is scourged with consumption; the deaths from this disease being almost 13,000 per annum, and steadily rising. We have yet to hear of anyone who always worked and slept in rooms with the windows wide open, who afterwards contracted the disease.

Another objection to casements is, that if left partly open they can easily be opened wide, by anyone from the outside. This enables a tramp to abstract things from the house in the temporary absence of the owner, and gives a feeling of insecurity to those occupying ground floor bedrooms, which may make them shut their window at night. The sash window, if the lower one is *fixed*, is quite safe. The sash never leaks, and if green hemp is specified for the cords needs practically no repairs. The casement window will leak, the hinges get out of order, the frame twist, and the fasteners get pulled off in storms.

All the 60 or 70 Exhibition cottages at Letchwork have these casement windows, and I observed that though put up regardless of cost, about half of them would not open at all freely, many not at all. These windows are picturesque, and so in England are the rage. Bourneville and Port Sunlight have helped to make them popular, but, in my opinion, there are few bedrooms in either of these "model" villages that any sensible person would spend a night in, if he could help it. The chimneys should not be in the gables; a very large part

of the heat of the fire is thereby wasted—quite enough to keep a couple of bedrooms warm a day.

I may say the judges of the Letchwork cottages condemned chimneys in the gables and casement windows, and then gave first prize to a cottage that had both these defects! I think that one-storey cottages are best. I am aware they are a little more expensive than two-storey ones, as the roof is larger, but this enables enough water to be collected and stored in a concrete cistern to supply the family. The cost of a well may be saved, and the water is better for washing. The can of water daily, for drinking and cooking, can be carried a considerable distance without much trouble. The cost of the stairs is saved, and if the eaves are wide the house is kept drier.

These houses should never be built in pairs. It saves very little when the cost of a wall to separate the garden is taken into account, and leads to constant trouble between the neighbours from quarrels among the children or trespass of fowl.

Besides, each house should be set so as to get the maximum of sunshine, and this is impossible if two are built together. In North China, where fuel is dear, they face all houses south, and one side of the street is always a blank wall. They say, "The heat of the sun costs nothing."

Now, single two-storey houses of this size will have a very "tower-like" appearance. It may be a sentimental idea, but the one-storey cottage is characteristically Irish, and I would like to see it preserved.—Yours, etc.,

ROBERT BROWN,  
Honorary Secretary of National Association  
for Prevention of Consumption  
(Ulster Branch).

Donaghmore, Co. Tyrone.

### The New Technical Schools.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

SIR,—I don't know whether the members of the profession generally will approve of the action of the Institute, as explained by the deputation to the Lord Mayor. The plea that the designing of the Technical Schools should be taken away from Mr. McCarthy because he has too much to do is a fiction so transparent that it is easily seen through. If he had asked to be relieved for that reason then the action of the Institute would be legitimate. It does not appear to me, now, to be so; and I can only say that the City Architect does not deserve treatment of this sort at the hands of his brother professionals.

But, as an architect myself, I don't expect much, and, when I am ousted, sometimes, by means so well described by a Ulster brother in your paper, I say nothing and let things slide, as Mr. McCarthy is apparently doing. But, all the same, it seems to me too bad that when a man is appointed architect to a public body, or a private board, or to an institution of any kind, that outsiders should try to oust him, and "grab" what in honour should be his.

Fancy the "Law Adviser" to the Corporation, for instance, being subjected to similar treatment, by his brethren suggesting to the Lord Mayor the getting of legal advice by competition instead of taking his!

We architects do shabby things to one another. We put our names on boards hung to scaffolding in order to advertise ourselves, and when a big law case is on we are ready to cut one another's throats in the witness box, as "experts" from whom, as a judge once said to me, "Good Lord deliver us!"—Yours, etc.,

SET SQUARE.

At the recent Milan Exhibition the well-known house of Messrs. L. and C. Hardtmuth were awarded, against all comers, the Grand Prix, which is the highest possible award, both for their world-renowned pencils and also for the celebrated Waterman's Ideal fountain pens.

**Newtownards.**—Tenders were received for the construction of a complete system of waterworks for Newtownards, for the Newtownards Urban District Council. The works comprise generally the driving of about 1,500 yards of tunnel through Scrabo Hill, the construction of a concrete reservoir of 2,000,000 gals. capacity in the townland of Ballycullen, the laying of an aqueduct and the various distributing pipes throughout the town, consisting of about 16,800 yards of cast-iron pipes, varying in diameter from ten inches to three inches, with the supply and fixing of all pipes, valves, meters, hydrants, specials, etc., the construction of a concrete reservoir of 100,000 gals. capacity in the townland of Corporation North, and the providing and fixing of pumping engines with all necessary fittings. The engineers are Messrs. Swiney and Croasdale, M.M.Inst.C.E., Avenue Chambers, Belfast.

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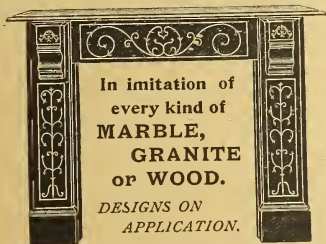
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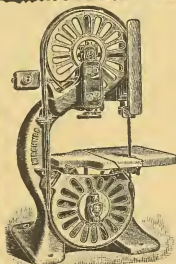
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## LAW CASES.

**Adherence to Deposited Plans.—Important Action Against an Urban Council.**

In the Court of Appeal last week, before the Lord Chancellor, Lord Justice Fitzgibbon, and Lord Justice Holmes, an appeal was opened on behalf of the plaintiffs in the action of Georgina W. Bradshaw and Alice Faulkner against the Bray Urban District Council. The appeal was brought from the order of Mr. Justice Barton, made 31st July, 1906, by which he dismissed the plaintiffs' action with costs as to two of the causes of action, and made a declaration in their favour as to the third—viz., a certain wall. The plaintiffs now asked that the judgment may be reversed with costs, and judgment entered for the plaintiffs in the terms of the prayer of the statement of claim, on the grounds that Mr. Justice Barton's judgment was contrary to the evidence, that evidence was excluded wrongfully, and that it was contrary to law. It appeared that the Council acquired, under Part III. of the Working Classes Act—in pursuance of a scheme brought in by them in 1899—land situated at Purcell's Fields, rear of the Main Street, Bray. On this land, which had been acquired by them compulsorily from the plaintiffs' predecessor in title, they proposed, in the first instance, in pursuance of the above-mentioned Act and the Public Health Act (1878), to erect 45 cottages, to lay out a playground in the centre of the ground, and to widen the present approach to the field from 9 feet to 50 feet. Plans to this effect were lodged with the Local Government Board. Subsequently the Council decided to alter the scheme by erecting 52 cottages, 28 of which were to be erected in streets on the site of the originally proposed playground, and by widening the entrance to 20 feet only. They alleged they made these alterations with a view to provide more cottages for the working classes; and it was contended for them that the plans deposited were merely a matter of ground plans, that they were also within their rights in their new proposal to build houses higher than those in the first plans, and that there was no breach of contract in altering the width of the approach. The plaintiffs, as owners of land adjoining suitable for substantial villas, and on which some had already been erected, sought in the Court below an injunction to enjoin the defendants from deviating from the proposals as originally shown in the deposited plans, alleging that it would seriously affect their property in value and amenity. Mr. Justice Barton refused the injunction as set out in the notice of appeal, holding that the plans were incorporated in the Act only for the purpose of identifying the lands, and that the defendants need not, therefore, adhere to them. From this the appeal was now taken.

The case has not yet concluded.

**The Portrane Asylum Contract.**

In the Chancery Division, before the Master of the Rolls, in the case of Collen and Co. v. the Joint Committee of the Richmond Asylum.

Mr. Arthur W. Murray (instructed by Mr. M. Good) applied on behalf of the plaintiffs, who are contractors carrying on business in Portadown, for an order that the defendants should make discovery of documents. Counsel stated that the action was brought to rectify the original contract for the erection of the auxiliary asylum at Portrane. It appeared that the sum in the original contract was £167,000, and plaintiffs now sought to have that amount changed to £167,830. The statement of claim alleged that a mutual mistake had been made as to the price to be paid from four different sections of the asylum, amounting in all to £830, that these works had been done, and that the defendants had admitted that they should be paid for, but that being trustees of public money they could not pay plaintiffs, as they were not legally bound to do so. Thereupon the present action was instituted. The defendants in their defence denied the allegations of the plaintiffs, and pleaded that the demand not having been discharged within six months, it could not under the provisions of the Local Government Act be recovered. They also pleaded that another mistake had been made in the same contract, involving the sum of £400, and that they should get a set-off

for that amount. To this the plaintiffs replied, demurring to the defence of the Local Government Act, and as to the £400, that it had already been adjudicated upon by Sir Thomas Drew. Mr. Philip White (instructed by Messrs. V. B. Dillon and Co.) appeared for the defendants, and asked for a cross order of discovery as regarded their set-off. He also asked that the plaintiffs should be limited as to time and matter in their order against the defendants.

The Master of the Rolls said he would not make any orders that would re-open the contract of £167,000. Counsel should confer as to the particular documents they required to be discovered, and renew the application.

**Kingstown Contract Cases.**

In the Nisi Prius Court before Mr. Justice Gibson and a City Special Jury, the case of M'Loughlin v. Harvey, Ltd., building contractors, Dublin and Belfast, against Edward Harten, spirit grocer, Upper George's Street, Kingstown, was concluded. The action was brought to recover £200, balance alleged to be due by the defendant to the plaintiffs on two contracts for certain alterations carried out by the plaintiffs on the defendant's premises in Kingstown. The defence was that the extra works claimed for were in contravention of a clause in the written contract, which set forth, "that any alteration which involves additional cost is to be borne by the contractor, unless he shall have previous to its execution obtained the written order of the architect therefor, which written order is to be countersigned by the employer." The defendant further pleaded that the contract had not been carried out in accordance with the specifications, and he counter-claimed for negligence in the execution of the work. Plaintiffs, in reply, pleaded that the works claimed for had been certified by the architect, and that they were not within the meaning of the clause quoted.

Messrs. Campbell, K.C., M.P.; Chambers, K.C., and Thomas Patton (instructed by Mr. F. G. Sharpe) appeared for the plaintiffs.

Messrs. Gordon, K.C. M.P.; Powell, K.C., and A. Dickie (instructed by Mr. R. Dickie) appeared for the defendant.

The Judge, having withdrawn all the questions from the jury except the question of the counter-claim, and they having found for the plaintiffs as to that,

Judgment for the plaintiffs for £150 was now entered by consent.

In the case of Harten v. M'Namara, which was an action brought by Mr. Harten, the defendant in the above case, against Mr. M'Namara, the architect employed by him in connection with the building contract, to recover damages for alleged negligence, a verdict and judgment was by consent entered for the defendant, Mr. M'Namara, with a named sum for costs.

The consent was made a rule of Court, and the case was struck out of the list.

Messrs. J. H. Campbell, K.C., M.P.; Chambers, K.C., and James O'Connor (instructed by Mr. Good) appeared for Mr. M'Namara.

**MOUNTCHARLES STONE.**

Messrs. George A. Watson and Co., Ltd., of Brunswick House, 100 Great Brunswick-street, Dublin, and Liverpool, draw our notice to this splendid Donegal freestone, of which they are now the sole proprietors.

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It has been specified for use for many important buildings in Scotland, Lancashire, and London, notwithstanding that there is no building at present in Great Britain to show the stone, but the architects and engineers who have investigated for themselves the qualities of Mountcharles stone by visiting the quarries and buildings in Ireland are convinced that there is no stone of its character to equal it as regards appearance and durability.

Where it is necessary, Messrs. Watson inform us that they can supply the stone dressed ready for fixing, and are at present arranging to keep in Dublin a stock of worked cills, steps, heads, etc., for immediate delivery.

*Supplement to "The Irish Builder and Engineer," December 15th, 1906.*



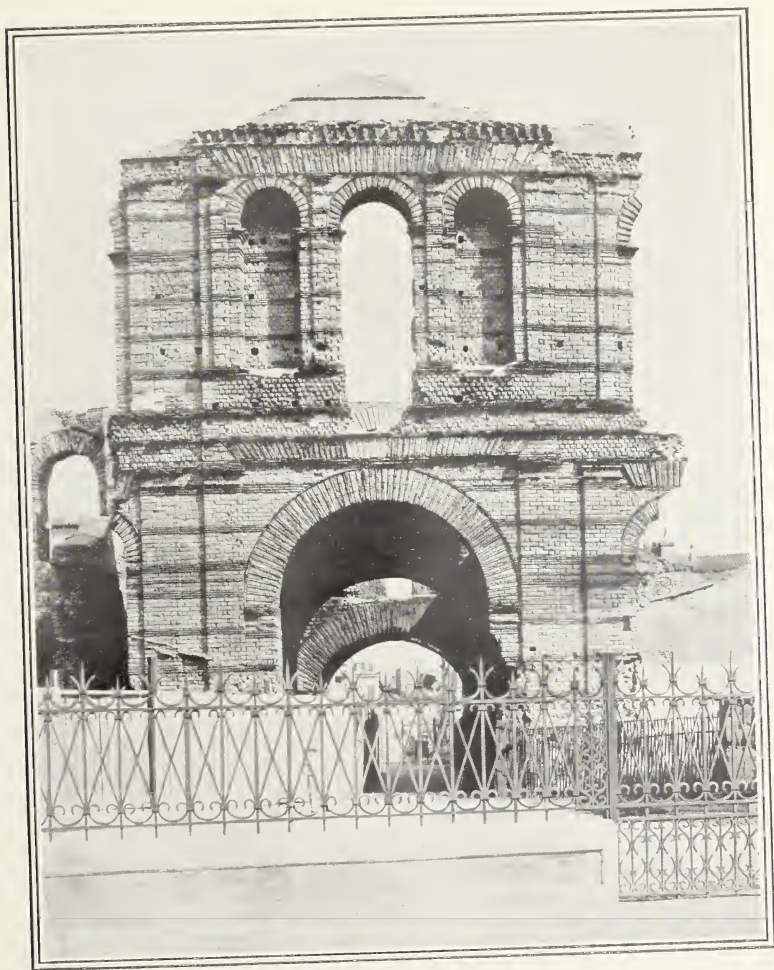
*Photo by]*

*[Maison Terpereau, Bordeaux*

**The Cathedral of St. Andrew, Bordeaux.**







*Photo by* ]

[ *Maison Terpereau, Bordeaux.*

**Ruins of the Gallien Palace, Bordeaux.**



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### ARCHITECTURAL ASSOCIATION OF IRELAND JOTTINGS.

The Association, having passed through an education and a museum session, is now apparently to be favoured with a library session. Mr. C. J. McCarthy, the City Architect, has just presented our society with a magnificent collection of books, and many modern architectural works have been purchased with Mr. Burke's donation, he having kindly handed over his fees, as lecturer to the Building Construction Class, for the purpose of increasing the A.A.'s stock of educational literature. A list of these volumes will shortly be published, and now that the reading room has, by subscription, been re-decorated and made snug, it may confidently be anticipated that the library shelves will be more frequently visited. A gap in the requirements of the Association has, therefore, by the generosity of a few of its members, been adequately filled.

\* \* \* \* \*

The Association will heartily congratulate Mr. James H. Webb on his election to the onerous post of Honorary Secre-

tary to the Royal Institute of Architects, Ireland. Mr. Webb has held practically every post of honour in the A.A., and to each he has given his best. His devotion to the Society has been fully appreciated by all, and it is evidence, if such were needed, of how intuitively the A.A. recognises its energetic members, to find the senior body electing one of our most esteemed officials to such a responsible position.

\* \* \* \* \*

Another of our members, Mr. R. M. Butler, who has aided the Association in every direction from its inception, and to whose energy and common-sense a great deal of the recent architectural revival is due, has lately been elected a Fellow of the Royal Institute of British Architects. The writer, who was closely associated with him and his efforts, during the dark days, when the A.A. was struggling for existence, and when the junior members of the Institute were making their presence and needs felt at the meetings of the senior body, can testify to the time and trouble Mr. Butler generously expended in endeavouring to better the position of the architectural student in Ireland. The results already attained must be a reward to him for his labours, and in the honour which he has just received he will deservedly obtain the good wishes of each of his fellow members in the A.A.I.

\* \* \* \* \*

There is a secretaryship of the Technical Demonstrations going begging. Surely some of the younger members will evolve enough energy to see this important section through. The Dublin merchants and manufacturers are always so willing to assist, that, beyond preparing a programme, the duties of the office are but slight.

\* \* \* \* \*

The A.A. will send its President to represent it at the Congress of the Royal Sanitary Institute, to be held in Dublin in June next. The burdens of official position in the Society grow yearly heavier, strong evidence of the steady progress of our educational position in the Irish architectural world.

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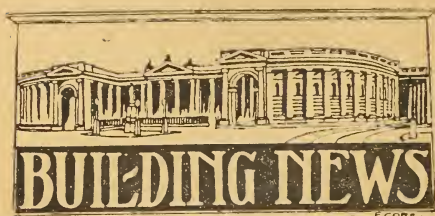
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**Antrim.**—The Irish Tourist Development Co. are about to build a large hotel at Larne, which will contain entertainment halls, billiard rooms, spacious saloons, and altogether accommodation for 400 guests. The estimated expenditure will be £25,000, which will also include improved coaching and steamer service.

**Belfast.**—The first of the three Carnegie branch libraries, erected through the munificence of Mr. Andrew Carnegie, LL.D., who granted to the Council of the County Borough a sum of £15,000 to defray the cost of the buildings, has been opened. The contractors for the work were as follow—For the general building, Messrs. Robert Corry, Ltd.; heating, ventilating, and ornamental ironwork, Messrs. Musgrave and Co., Ltd.; plumbing work, Messrs. Richard Patterson and Co.; metal casements, Messrs. Williams, of Chester; mosaic tiling, Rusts, Ltd., London; woodblock flooring, Messrs. Geary, Walker, and Co. The electric lighting was done by Mr. Stanley Johnston, and the stone carving by Mr. Winter. The whole work was carried out from the plans and under the supervision of the architects, Messrs. Graeme-Watt and Tulloch, of 77a Victoria-street, who are also the architects for the two other branches. We published illustrations of the three libraries in a recent issue.

The Improvement Committee of the Belfast Corporation met last week in Belfast City Hall, when the bill of extras in connection with the erection of the City Hall, amounting to £72,000, served on the architect of the building by Messrs. H. and J. Martin, the contractors, was under consideration. A letter from Sir Bramwell Thomas, the architect of the City Hall, to the Town Clerk, was read. It stated that he had received from Messrs. Martin, the contractors, an account (which accompanied the communication) for £72,000 for extras in connection with the construction of the building. Sir B. Thomas, we understand, pointed out in the communication that he understood the estimate of £260,000 covered all extras. The Committee passed a resolution instructing the Chief Clerk to communicate with Sir Bramwell Thomas, requesting his attendance before the Committee on yesterday (Friday), in order that the bill of Messrs. Martin might be inquired into.

The Royal Institute of British Architects, at their meeting in London on the 3rd inst., elected Mr. William J. Fennell, of Belfast, a Fellow, in recognition of his abilities as an architect. This intimation will be received with pleasure by Mr. Fennell's many friends in this city, who will join heartily in congratulating him upon this well-deserved honour.—"Belfast News Letter."

**Cork.**—Tenders have been received for building a store in Hanover-street for Mr. M. O'Donoghue. The architect is Mr. Arthur Hill, B.E., M.R.I.A., 22 George's-street, Cork.

**Dublin.**—Tenders are invited for alterations to Elm Park, the residence of the late Lady Ffrench, Messrs. Doolin, Butler and Donnelly, of Dublin, are the architects.

The extension to the premises of Messrs. Arnott and Co., Ltd., Henry-street, are being pushed rapidly forward. Mr. George P. Beater, 17 Lower Sackville-street, is the architect. The contract is being carried out by Messrs. J. and P. Good, Ltd., Great Brunswick-street, Dublin.

The new branch of the National Bank, Ltd., at present being erected on Arran-quay by Messrs. J. Donovan and Son, is from the designs of Mr. J. Franklin Fuller, Great Brunswick-street.

Messrs. G. W. Scott and Co., 12 Ushers-quay, have secured the contract for the new gymnasium at the Royal Hibernian School. They are also building a new temporary dining hall of galvanised iron for the R.I.C. Depot, Phoenix Park.

Additional bedrooms and a new billiard room are being added to Ross's Hotel, Parkgate-street. Messrs. G. W. Scott and Co. are carrying out the work, under the direction of Mr. F. Bergin, B.E., Westmoreland-street, Dublin.

A new organ and organ chamber, according to the designs of Mr. J. F. Fuller, will shortly be erected in Donnybrook Church.

**Dalkey.**—Messrs. J. and P. Good, Ltd., are building a villa at Dalkey facing the old railway, which runs along the edge of the present Dublin and S.E. Railway. The plans and specifications are by Mr. J. H. Webb, M.R.I.A.I., Clare-street, Dublin.

**Drumglass.**—An effort is being made to erect new parochial schools at Dungannon. The old schools have been condemned by the sanitary authorities and the school inspectors. The estimated cost of the undertaking is calculated at about £2,000.

**Dungarvan.**—The Board of Guardians of the above Union will, on the 18th December, consider applications for the performance of the duties of clerk of works in connection with the building of medical officer's residence at Knocknaskagh.

**Galway.**—The Board of Guardians invite plans and estimates of a Fever Hospital proposed to be erected at Galway. A prize of £25 will be given for the plan, etc., which will be considered the best and most suitable; but, in the event of the Guardians deciding to give the supervision of the building to the architect or engineer whose plan has been accepted, this prize will be merged in his fees. The selection will be made by an architect or engineer having no interest in the business. Further particulars appear in our advertising columns.

**Julianstown.**—Tenders have been invited for additions and improvements to Julianstown Church. The church will be lengthened, an entrance porch built, and a tower and spire erected. The surveyors are Messrs. Patterson and Kempster, 95 Lower Leeson-street. The designs and specifications are by Mr. J. Franklin Fuller, F.S.A., 179 Great Brunswick-street.

**Kingstown.**—Mr. G. Hanley, Sandycove, is at present building a semi-detached villa in Oranmore-place, the architect being Mr. Wm. Stirling, 4 College Green.

The Local Government Board have sanctioned the loan of £9,500 for the construction of new baths at Victoria Beach. The Local Government Board have also sanctioned the following loans in regard to improvements in the township:—£400 for the purchase of a refuse destructor, £500 for the erection of Technical Schools; £550 for the reconstruction and improvement of Sandycove Baths; £200 for the construction of the new road from Paradise-row to Lower George's-street, and £865 for the making of the new road from Crofton-road to Dunleary crossing; also £1,205 under the provisions of the Public Libraries Amendment Act.

**Killiney.**—The Urban Council are prepared to receive tenders for an addition to the Victoria Hill Lodge, Killiney. Plan and specification may be seen at the Council offices, Killiney. Tenders close on the 20th inst.

**Kilcurry.**—Tenders are invited for the carrying out of alterations to curate's residence at Kilcurry. Tenders close to-day (Saturday). Mr. Vincent J. O'Connell, architect, Dundalk.

**Limerick.**—It is reported that the proprietors of a leading bacon factory are about to establish a branch of the business at Athlone, and are looking for a site.

St. Michael's R.C. church is being decorated by Mr. John M'Namara, of Catherine Street. The work is of the highest class of decorative art, detailing itself into scrolls, medallions, and figure painting. The style is Roman in character, and reminds the observer of the Sistine Chapel, in some of its parts. In the panels occupying the spandrels of the chancel arch are the episcopal figures of St. Patrick and St. Munchin, the patron saint of the city. They are seated in a somewhat reclining position with the femoral drapery covering a section of the label moulding. The naturalisation comes in by a studied shading that falls over the faces of the voissiors at this segment, giving the idea that if the fold were lifted the full sweep of the arc could be seen. The apsidal side of the chancel is to be decorated with other subjects referred to in church history. Mr. Henry O'Shea, the well-known artist of this city, is the painter of the figures. He is also engaged at another work at the Redemptorist Church.

Three lofty warehouses, in brick and limestone, with terra-cotta trimmings of a rich character, are just completed in William-street, by Messrs. John Ryan and Sons. Frontage 70 feet, by 50 feet in depth.

**Maryborough.**—The new schools for the Christian Brothers, Maryborough, are approaching completion, and will shortly be opened. The designs are by Mr. J. P. Wren, M.R.I.A. Mr. Carroll, of Maryborough, is the contractor.

**Navan.**—An important addition is to be put to the Navan Convent at a cost of about £3,000. M. T. F. MacNamara, of Dublin, is the architect.

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8 City Quay—Telephone No. 2316.



**Rathdrum.**—The Board of Guardians of Rathdrum Union received tenders for carrying out alterations in the Work-house buildings.

**Rathvilly.**—The three altars of St. Patrick's Church, Rathvilly, have just been consecrated. The church is of pure Gothic style, from the designs and specifications of Mr. Wm. Hague, 62 Dawson-street, Dublin. It is intended later to carry the tower to a considerable altitude, and to finish it with a spire and wrought iron cross. The high altar, executed by Messrs. Early and Co., Camden-street, Dublin, is in the 12th century style of Gothic architecture.

**Royal Oak.**—A large three-storey building, measuring 104 ft. 6 in long by 80 ft. 9 in wide, has recently been completed for the Great Western Railway Co. at Royal Oak Station from the designs of Mr. W. Armstrong, M.Inst.C.E., engineer for new works to the Company. Although apparently of red brick, the structure comprises a complete framework of Hennebique Ferro-concrete, with floors and a flat roof of the same material. The floors, designed for the normal superload of 500 lb. per square foot, are carried by longitudinal beams with the average span of 24 feet, spaced 5 feet apart centre to centre. In addition to the heavy loads to be carried by the wall and interior columns, the building is subject to severe vibratory stresses, due to express main line traffic, within 5 feet from the front wall.

The results of the official tests recently conducted were very satisfactory. The specification demanded that the floor should be capable of withstanding the load of 810 lb. per square foot without permanent deflection. As shown by the results, however, the floor actually withstood 90 lb. per square foot more than the specified test load, not only without permanent deflection, but even without any elastic deflection, while still under the load of 468 lb. per square foot. Moreover, the tests showed that the maximum deflection under the load of 930 lb. per square foot was less than 1/4,000 of the clear span of the beam.

**Stranorlar.**—The Rural District Council will, on the 17th of December, receive applications from qualified persons to fill the position of architect to the Council under the Labourers' Acts.

## REVIEWS.

### The Building Mechanic's Ready Reference.

The Building Mechanic's Ready Reference." Carpenters and wood-workers edition. By H. G. Richey. Price, 6/6 net, Limp Morocco. New York: John Wiley and Sons. London: Chapman and Hall, Limited, 1906.

A very attractive and useful little American work is "The Building Mechanic's Ready Reference," which is intended as a handy manual of reference for the carpenter and joiner. Everything in the book is very plain and straightforward, and, as the author aptly observes in his preface, that "in this progressive age, building processes, in common with everything else, have been so condensed that all antiquated and roundabout methods are naturally forced aside, and it is the man who travels the shortest road that wins the race." The aim in view is declared to have been the removal of obsolete and roundabout methods which hamper the mechanic who desires to be successful and up-to-date.

Exceedingly useful directions for laying out work. For instance, such simple short cuts, not universally known as, "to approximate the number of squares in a roof. If  $\frac{1}{2}$  pitch, find the floor surface and multiply by  $\frac{1}{2}$ ; if  $\frac{1}{4}$  pitch, by  $\frac{1}{4}$ , and if  $\frac{3}{4}$  pitch, by  $\frac{3}{4}$ , and so on with the length of rafters, etc., laying out high rafters, octagons, dome roofs, etc. In connection with rafters there are a number of rafter tables of a most time-saving character given, the span, the quantity of material required can be approximated in a moment. Tables of treads and rises in stairs save much delaying, if simple calculations; and the simpler a calculation is, the more annoying it is to have to stop to make it. Cubic excavation tables are worked out on similar lines.

What are called "Lumber tables," are tables containing a mass of information, giving the cube contents of boards and scantlings in very quick fashion. The tables of strength and weight of materials, are complete and well arranged, as are the mensuration and miscellaneous tables, including receipts, hints, etc. Altogether, for its size, it is the most useful work of the kind we have come across, and, although only dealing with carpentry and joinery details, will be found useful as well by engineers, architects, builders, shop foremen, and others, as by artisans of the particular trades.

In these days of keen competition and close cutting, the builder and the shop foreman who can "close cut" their materials, without scamping or blundering, avoid much waste, and, therefore, stand at a distinct advantage over their fellows. Richey's little book will help such men. The country builder or carpenter who has not had the advantage of a training in a first-class shop, will, in particular, find it a boon.

### Elementary Science applied to Sanitation and Plumbers' Work.

By A. Herring Shaw, R.P.C. Price, 2/6 net. London: The Sanitary Publishing Co., Limited, 5 Fetter-lane, London.

A capital introduction to the elements of science required of an intelligent up-to-date plumber, supplying in concise form a means for acquiring just that species of knowledge in which the average modern schoolboy is so lamentably deficient. Rightly, the book starts with Elementary Practical Geometry, including that important detail, the development of the surfaces and solids, and above all, that fundamental branch of human knowledge, arithmetic, rendered in modern and rational fashion, so as to be useful. For instance, how many boys straight from Irish schools can do a simple sum in duo-decimals quickly and accurately?

The work proceeds to deal with many and more technical subjects pertaining to sanitation and plumbing on the basis of natural philosophy; as for example, illustrating the principle of the syphon, thermometers, barometers, heating, ventilation, etc., and something of the elements of chemistry.

In brief, the book is a very useful and practical one.

### A Glossary of Terms used in Architecture.

By Thomas Dinham Atkinson, Architect, with 265 illustrations. London: Methuen and Co., 36 Essex-street, W.C. Price, 3/6 net.

This is quite a little book, much smaller in fact than time-honoured Parker. It is a handbook adapted to the wants of the student or amateur requiring the aid of a Glossary, and fulfils its object, which is not ambitious, though useful. Much of the matter is necessarily very elementary, but there is evidence of care and consideration in the choice and treatment of matter.

The author is more catholic in his taste than Parker, and so we get more of renaissance work in his pages.

The illustrations are suitable and sufficient.

## BOOKS RECEIVED.

"Building Contracts, Building Leases, and Building Statutes," with precedents of building leases and contracts and other forms connected with building, and the Statute Law relating to building (including the London Building Acts 1894-1905), with notes and cases under the various sections, together with "An Appendix of Unreported Building Cases," by his Honour Judge Emden. Fourth edition, by Joseph Bridges Matthews, of the Middle Temple and the Oxford circuit, and W. Valentine Ball, of Lincoln's Inn and the North-eastern circuit, Barristers-at-Law, with a glossary of architectural and building terms. (Revised and extended by Maurice B. Adams, F.R.I.B.A.) London: Butterworth and Co., 11 and 12 Bell Yard, Temple Bar, W.C., Law Publishers, 1907.

"Building Cases," being a digest of reported decisions affecting architects, surveyors, builders, and building-owners, by F. St. John Morrow, L.L.D., (Dub.), of Inner Temple, and the South-eastern Circuit, Barrister-at-Law. London: Butterworth and Co., 11 and 12 Bell Yard, Temple Bar, Law Publishers, 1906.

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# ENGINEERING SECTION.

## ITEMS.

The Royal Commission on Canals and Waterways has presented its first report, which, while it contains much information of value, is not sufficiently classified to enable the ordinary man to comprehend the chaotic mass of evidence without an unnecessary loss of time. As Ireland has, so far, been only superficially considered, we do not intend to comment on the instalment just issued, which is chiefly a recitation of witnesses' evidence. It is stated that the Canals and Inland Navigation of Ireland will be dealt with later, and the data collected from this country will doubtless greatly assist the Commissioners in framing their final recommendations. \* \* \* \*

The ranks of the engineering profession are to be invaded by a member of the fair sex, if reports speak truly. At the next meeting of the Galway County Council, a notice of motion will be considered to elect Miss A. Perry, B.E., to the post of County Surveyor, rendered vacant by the death of her father, until such time as a permanent officer may be elected. As Miss Perry is the first lady in Ireland who has qualified in engineering, we extend our good wishes for the success of the motion, and, having regard to the lack of initiative displayed by some of the county surveyors in this country, would suggest that "angels tread where fools fear to venture" may be a suitable paraphrase for such a unique occasion. \* \* \* \*

The United States Government has definitely decided to construct the Panama Canal by contract, instead of by direct labour. With a spirit which might with advantage be copied elsewhere, it has further been decided to invite unlimited competition, although the magnitude of the undertaking will naturally exclude all but the largest firms in the world from tendering. The tenders are to consist of terms of profit percentage on prime cost, which will be ascertained by a board of five engineers, three of whom are to be appointed by the Government, including the chief engineer to the Canal Commission, and two by the contractor, an arrangement which seems to be very well considered. There is little doubt that British firms will be found amongst those who tender, and it will be satisfactory if such a scheme is carried out by one of them, provided that the purchase of materials and plant be not confined to the United States. \* \* \* \*

There is little doubt that the architectural profession is in a parlous condition, which engineers may deplore but cannot wonder at. The whole policy of the profession appears to be directed by men who have not the courage of their convictions, resolutions are continually launched with much sail and but little ballast, they sink at the first puff of wind when they leave the harbour of the Council Chamber, and are heard of no more. Those who have control of architectural destiny give with one hand and take away with the other. An instance of this is seen in the solemn resolve to close the ranks of the fellowship R.I.B.A. on December 31st, except to those who have passed their Associateship examination. On this understanding Fellows, whose qualifications are not always of the highest standard have, during the past few months, been elected wholesale. But on the near approach of closing day, the Council becomes timorous of its own proper resolve, and decides to extend the period of free election for another twelvemonth. It is little wonder that our architectural brethren envy the engineers the slow, steady and carefully considered policy of the engineering institutions. \* \* \* \*

For years past rumours, more or less vague, have been current that much boring under the city of London is so disturbing the foundations of St. Paul's Cathedral as to seriously endanger portions of the building. Attention was drawn to this matter over four years ago by our contemporary "The Daily Mail," but the authorities scoffed at the idea. Flushed with its victory over the Soap Trade, "The Mail," is now returning to the charge, and very tardily the Dean and Chapter are recognising the gravity of the case, and an influential committee of professional men, including Mr. T. E. Collcutt and Sir Aston Webb, are to make a thorough investigation. Already sufficient evidence has

been afforded to prove that the building is out of plumb, and such a condition of affairs in a building of the type of St. Paul's is of more than ordinary consequence. The Cathedral engineers have reported that a gradual "draw" or subsidence has been taking place for a considerable period in the subsoil, and, although it is uncertain whether such is continuing, there is no proof that it has ceased. The cause of the movement is the drainage of the gravel stratum upon which the Cathedral is built, and which, in turn, lies upon the London clay some 34 feet below ground level. The present foundations are but some ten feet below the surface in some places. It can readily be imagined what a disastrous effect will result if the water-logged gravel is being drained by the excavations and borings which for years past have been in progress throughout the city. The cost of carrying the foundations down through the gravel to the clay would be enormous, but it is well that, even after four years' delay, the authorities have decided not to blink facts, but to have resolved on receiving an independent and weighty opinion on a matter which may be affecting the stability of the national monument in their charge. Whether a committee of architects is a better authority than a council of engineers on such a reference is, however, open to question. \* \* \* \*

The Royal Institute of British Architects recently renewed their consideration of the question of public officials acting as architects for public buildings, and a sweeping resolution against such a practice was duly proposed and seconded, a rather acrimonious debate following. At first glance the general attitude of the architectural profession on the matter appears to be reasonable. A public official draws a certain salary for executing certain duties, and it is held that he can give neither the proper amount of time and attention to the design and plan of a new building of considerable size and importance. The result is that work, bearing the obvious imprint of hasty consideration, may be observed scattered through the cities and towns of the Kingdom. But on closer inspection this attitude loses much of its strength. The general tendency for years past has been for public bodies to appoint officials who are qualified architects to control their architectural work, and this inclination has naturally received whole-hearted support from the professional representative societies. Unless it be granted that the receipt of an official appointment transforms an architect into a soulless thing, it would appear that a complaint against his designing buildings for municipal purposes, of the requirements of which he is specially cognisant, is not well founded. Why do we not hear of the Institution of Civil Engineers resolving that municipal engineers should not carry out engineering works? Is it because the careful training of an engineer causes him to weigh his words and analyse his thoughts carefully before rushing into wordy schemes, which, when carefully considered, are found to be absurd in construction and impossible of execution? To do them justice, however, our brethren, the architects, eventually added the words, "unless they have had architectural training," to the original resolution before it was passed. It is noteworthy that this eminently sensible addition was suggested by Mr. W. E. Riley, the superintending architect to the L.C.C., one of those municipal architects who are, apparently, such a bug-bear to the profession. \* \* \* \*

We have from time to time commented on proposals that were being made to supply electric power at a reasonable rate to the Rand, chiefly for the mining industry, but also for various other commercial undertakings in Rhodesia and the Transvaal. We understand that British and German capitalists are now combining to give effect to a scheme which, when carried out, will economically and effectively aid in the development of the country. Until recently, while British engineers were considering the practicability of utilising the Victoria Falls for power production, the Germans were investigating the possibility of establishing a steam-driven station. The requirements of the country would be beyond the capacity of the latter scheme, and with such a reserve of force to hand as is contained in the river Zambesi, it is not a matter of surprise that a project for harnessing the Victoria Falls, as has already been accomplished at Niagara, should take predominance of all others. The details are still in a chaotic condition, but it is anti-



culated that a canal will be formed on the north side of the river to generate power at the Falls, whence the current will be transmitted to the various centres. A steam reserve station will also be erected on the Rand, for use in case of breakdown or other emergency. This latter portion of the project will be the first to be put in hand, and it is anticipated that it will be in use in about two years, with a capacity of 20,000 h.p. The two stations on the Rand which at present sell power develop less than 9,000 h.p. It is satisfactory to learn that while German capital is invested in the enterprise, and much of the material will be purchased in that country, yet a large proportion of the latter, including the boiler plant, will be obtained from the United Kingdom, and that British control will predominate. The execution of this gigantic project will be watched with great interest by engineers and economists, and it is to be hoped that no insuperable difficulties will be a hindrance to a happy issue of the enterprise.

\* \* \* \*

We understand that the scheme for connecting the Great Southern and Western and the Cork, Bandon and South Coast Railways in Cork, will shortly be put in hand. The new line will leave the existing Bandon railway at a point south of Gasworks Road, and pass between the present line and Eglington-st., to the existing terminus, which will be suitably altered. New bridges, 60 feet wide, will span the north and south channels of the Lee, and from the former a much-needed thoroughfare will be formed to the foot of Summerhill, thus relieving the congestion of traffic in Patrick Street, and the loss of time involved by taking the present circuitous route from the north to the south side of the city. The line will be low-level, running in the centre of the new thoroughfare with a single track, and, in order to give vessels access to the Custom House berths, the bridges will be of the bascule type. The Parliamentary estimate was about £100,000, of which sum the Treasury will provide one quarter, the C.B. and S.C. Railway will subscribe £15,000, the Cork Harbour Board, £10,000; whilst the Great Western Railway Company of England will see that the scheme is carried to completion. Mr. J. R. Kerr, the engineer to the C.B.S.C. Railway, will generally supervise the work.

\* \* \* \*

At a special meeting of Galway Co. Council, Miss Alice Perry, B.E., was appointed Interim County Surveyor in room of her father, the late Mr. James Perry. The permanent appointment will be made at the February meeting of the Council. Yesterday it was resolved to fix the emoluments of the office as follows:—Salary, £340; office expenses, £60; travelling expenses, £100; total, £500. Formerly the appointment was worth about £1,000.

## IMPORTS.

### PORT OF DUBLIN.

November 27.—Per Inishowen Head from Montreal and Quebec, 33,453 pcs. firewood, sawn to order.

November 30.—Per Fairy Queen, from Annalong, 90 tons bricks, T. and P. McCorry.

December 1.—Per City of Frankfort from Antwerp:—2 cases window glass, Glass Supply Co.; 3 cases do., Clery and Co.; 10 cases do., W. and R. Jacob and Co.; 25 cases do., T. Dockrell Son and Co., Ltd.; 87 cases do., Hoyte and Son.; 100 cases do., T. and C. Martin, Ltd.; 56 cases do., Brooks, Thomas and Co., Ltd.; 39 cases do., A. Bassi; 30 cases do., W. Collins; 56 cases do., W. Martin and Son; 45 cases do., H. Sibthorpe and Son; 500 bags cement, 420 joists, 4 cases marble, to order.

December 3.—Per I. and A. Coppack, from Belfast, 150 tons bricks, H. and J. Martin; Appleyby, from Paisley, 40 tons fireclay, T. and C. Martin, Ltd.; Harrier, from Bangor, 187 tons slates, N. McNaughton.

December 4.—Appleyby, from Glasgow, 112 tons fireclay goods, T. and C. Martin, Ltd.; Lady Wolsley and Olive, 1,000 sacks cement, T. Dockrell, Son and Co., 633 pcs. timber, — Jackson.

December 5.—Lord Claremont, from Baltimore, 334 tons roofing slates, 100 pcs. oak lumber, to order; per Lady Roberts, from London, 20 kegs lead, T. Dockrell Sons and Co., Limited.

December 6.—Ferdinand, from Chatham, N.B., 34,273 pcs. deals, 4,262 deal ends, T. and C. Martin, Limited.

December 8.—Per Maggie Warrington, from Ghent, 10,752 bags cement, 12 pkgs. limestone, to order; per Kangaroo, from Glasgow, 140 tons fireclay goods, R. Brown and Son; per Spencer, from Belfast, 130 tons bricks, H. and J. Martin, Limited.

December 10.—Per Dunmore Head, from Montreal and

Quebec, 1,533 pcs. deals, 28,206 pcs. deals and scantlings; per Ellie Park, from Belfast, 153 tons bricks, Wallace Brothers, Limited.

December 11.—Per King's Oak, from Bridgwater, 105 tons bricks, Brooks, Thomas and Co., Limited; 6¼ tons bricks, Robinsons, Limited; per Louie Belle, from Runcorn, 60 tons bricks, etc., T. and C. Martin, Limited; 9 tons tiles, T. Archer; 41 tons tiles and 10 tons timber, J. Kelly and Son; per Marion, from Bridgwater, 1,200 tiles, — Robinson; 95 tons bricks, Brooks, Thomas and Co., Limited; per Dinorwic, from London, 270 tons cement, Wallace Brothers, Limited; per Lady Hudson-Kinahan, from London, 10 fms. lead, T. Dockrell and Co., Limited.

## THE REGISTRATION OF ARCHITECTS BILL.

The Society of Architects, London, in a recent letter issued to members, states that this Bill was set down for second reading during the recent Parliamentary Session, but was not reached, and, as no other than Government business is taken during the Autumn Session, the Bill must await the fortune of next Session, January or February, 1907. There is, however, very little prospect of progress unless an early place on the ballot can be secured.

In view of this, Mr. Atherly Jones, K.C., M.P., who has charge of the Bill, asks the co-operation of the members of the Society in inducing their local members of Parliament to ballot for the Bill.

The Council, therefore, urges members to at once see or communicate with their local members of Parliament, and is itself approaching those who have already signified their intention of supporting the Bill.

An opportunity here presents itself for united action, which, if properly used, will almost certainly fulfil its purpose of securing a hearing for the Bill at an early date.

It is on the broad question of principle that they ask for support, and not on matters of detail; if the Bill is read a second time and referred to a committee, the details can then be dealt with.

## ANSWERS TO CORRESPONDENTS.

### Oak Panelling.

E.C.D.—Very little panelling in hard wood is used in domestic work in this country, though, of course, common enough in England. We are too poor to indulge in such luxuries. Very simple panelling, such as you describe, with plain ovolo mouldings and 1¼ inch framings, would cost from about 4s. 6d. to 5s. per superficial foot. A fairly good architrave to doors, 3s. 6d. per foot lineal. The price of good selected and kiln dried Austrian oak, mahogany, and teak would be nearly identical, we believe.

### Failure of Timber Beam.

B.W.—We have considered the question of the beam which has failed, and are not surprised to find that one of this scantling would support safely a distributed load of about 45 cwt., which is not enough allowance for even an ordinary floor. With the heavy weights described on the floor, you would need to provide for about 300 lbs. to the superficial foot. To carry this over the span named, with due regard to safety, you should provide a new steel beam to bear a distributed load of 19 tons; say a steel joist 12 in. x 5 in. x 32 lbs. weight to the foot, as your floor is already arranged to suit a beam of that depth.

## TENDERS.

Howth.—For the construction of waterworks for the North Dublin Rural District Council. Hassard and Tyrrell, Westminster, and Kaye-Parry and Ross, Dublin and Westminster, engineers.—Mr. Jeremiah Fitzpatrick, Kanturk, Co. Cork, £8,471 7s. 6d.; Messrs. H. and J. Martin, Grand Canal-street, Dublin, £8,368; Messrs. Collen Bros., East Wall, Dublin, £8,130 8s. 2d.; Mr. John Graham, Lagan Steam Works, Dromore, Co. Down, £8,065 14s. 3d.; Messrs. Grainger Bros., Holywood, Co. Down, £7,442 14s. 4d.; Messrs. Galloway and Sons, 23 Castle-street, Sligo, £7,250; Mr. Daniel Clark, 14 Upper Northbrook-avenue, North Strand, Dublin, £6,906 9s. 6d.; Messrs. Martin and Co., Highfield House, Drogheda, £6,857 11s.; Messrs. M'Kee and M'Nally, Dunganon, £6,683 17s. 7d.; Messrs. Fleming Bros., 18 Lansdowne-crescent, Portrush, £6,240 10s. 11d.; Messrs. Alexander Hull and Co., Pembroke Works, Ringsend-road, Dublin, £6,249. Engineers' estimate, £7,300.

Blackrock (Co. Cork).—Tenders have been received for laying sewers at Cat Lane, etc., Blackrock, for the Cork Rural District Council.

## A METAMORPHOSIS IN BIRMINGHAM.

## A Notable Sewage Treatment Scheme.

The Birmingham papers record what they describe as a "metamorphosis" in relation to the sewage swamps of Birmingham, which are now a thing of the past. For years past the Birmingham sewage farms defiled and polluted the atmosphere of the pleasant suburb of Castle Bromwich, near which they were situated, and even assailed the nasal organs of the passengers in passing trains.

Briefly put, the sewage of Birmingham was until recently, and still is in part, treated on a sewage farm, where the system in use was the old "broad irrigation system." Early in May last the sanitary authority, the Tame and Rea Drainage Board, decided to extend the bacteria beds to more than double the then existing area, and thus finally to out the old and objectionable system.

The Tame and Rea Drainage Board is a very important body, indeed, including not merely Birmingham, but also Aston, Smethwick, King's Norton, Handsworth, Sutton, Coldfield, Erdington, etc., thus holding sway over more than ninety square miles, with a population of about 900,000 and the volume to be daily treated exceeds 25,000,000 gallons.

To treat such a huge volume by the broad irrigation system, the 200,830 acres of land which constitute the Drainage Board's estate, would be quite inadequate, but during the past four years bacteria beds have been constructed, and at the present time one-fourth of the sewage is dealt with in this way. It is some years since the Board came to the conclusion that it would be impossible to obtain sufficient land to meet the demands made by the ever-increasing quantities of sewage, for it meant that  $1\frac{1}{3}$  acres would have to be bought per week. Accordingly it was resolved to abandon the practice of precipitating the solids in the sewage by means of the lime process, the cost of which was not commensurate with the benefits, for it not only precipitated the sludge, but also the very micro-organisms which are now responsible for the ultimate purification of the liquid. It was found that the Birmingham sewage was rather deficient in bacteria, and that a larger number of organisms would accelerate the process of fermentation and liquefaction, and afterwards of oxidation and nitrification. In the sewage, as it arrives at the outfall works, there are about 400,000 bacteria per cubic centimetre, which represents a measure the size of a lady's thimble; whereas in London the sewage contains no fewer than five million organisms per cubic centimetre, and in Exeter, where the scientific bacteria process was first tried, six million. The reason of the disparity in this respect between Birmingham and the other places is because, owing to the nature of many of the city's industries, large quantities of acids get into the sewage, and these are inimical to the life of the bacteria. This difficulty has, however, been largely overcome by increasing the capacity of the tanks at the outfall works, and now the organisms are cultivated to such an extent that the sewage at Curdworth, where the bacteria beds are situated, contains no fewer than 17,000,000 bacteria per cubic centimetre.

## The Bacteriological Process.

In the liquefying or "septic" tank, as it is most frequently called, at Saltley, the main sewage undergoes a process which frees it from suspended matter, such as road grit, and of the organic and inorganic substances which go to form that unpleasant-looking compound technically known as "sludge." This sludge, which, according to Lord Bramwell's Commission, is the crux of the sewage-disposal problem, Mr. Watson has been successful in converting into an inodorous composition. The welcome transformation is almost entirely due to the work of micro-organisms, and though the process has not yet been carried to the full extent of its possibilities, yet the method is now fairly well understood. After the sludge has been eliminated, the sewage is at present conveyed down the Tame Valley in an eight feet diameter culvert, from which branch off numerous subsidiary carriers, and is evenly distributed over the land, where the process of disintegration is a natural one. But the land will only take a certain quantity of sewage, and the amount varies according to the weather, so that the

land in use resembles a swamp, and in Birmingham, with only this system in vogue, a great nuisance seemed imminent. Engineers and chemists, however, evolved the bacteria bed method, and already, as stated above, a quarter of the dry weather flow to the Birmingham works is thus treated, whilst, when the extensions have been made, the whole of it will be. One acre of bacteria beds is capable of doing as much work as from 50 to 70 acres of land, and it is this and similar striking facts which have induced the Drainage Board to pursue their present policy. It was mentioned at a recent meeting that during the present summer even, no sewage would be seen upon the land between Saltley and Castle Bromwich, and that, with the construction of the new beds, a similarly satisfactory state of things would obtain right down the Valley. The condition of the river, it is moreover pointed out, is better at Forge Mills after the effluent from the sewage works had mingled with the water than it was at Saltley, before anything had been allowed to enter the river. This, of course, shows that the work of purification being carried on by the Board is very efficient.

The underlying principle of purifying sewage in bacteria beds is to provide, by means of stone, or other hard particles, a habitat for the aerobic (those that require free oxygen for their vitality) and nitrifying bacteria. The best method of constructing such a habitat has exercised the minds of experts for many years, and when Messrs. Cameron Commyn and Martin, of Exeter, first introduced the system, the medium was placed in a tank, and after a certain number of hours the sewage which had been passed in was allowed to flow out again into the river. That process is being adopted by Manchester, Sheffield, Blackburn, Croydon, Burnley, Carlisle, West Bromwich, and some other places; but it has been admitted latterly that the more scientific as well as more economical, method, where physical conditions will admit of it, is the adoption of what is called a percolating bed, or continuous filter. By this method the media which form the habitat for the bacteria are placed upon a false floor, which rests on a concrete plane, and are built up to a height of about five feet. The bed is surmounted by distributing pipes, constructed in various ingenious ways, through which the sewage is sprayed over the surface of the beds. The drops percolate through the medium in about three or four minutes, and the sewage becomes changed into an innocuous liquid, which may be passed into the stream with no harmful effects. This particular method is to be seen working at Birmingham principally, for Birmingham has the largest sewage farm in the country, and also at Salford, Accrington, Derby, York, Hanley, etc., and the Leeds Town Council have just resolved to adopt a scheme similar to that at Birmingham, at an outlay of probably more than a million pounds sterling. Many other large centres of population are following suit, and, in the surrounding populous districts, Wednesbury, Brownhills, Tiivdale, Pelsall, and Rushall have recently constructed works on satisfactory lines, whilst at Oldbury, where the sewage is most difficult to treat on account of the trades of the town, a scheme is about to be submitted to the Local Government Board. Walsall has also prepared a scheme, and Tipton has now definitely adopted one. Bilston is pushing on with new works, and Willenhall proposes to follow suit, so that altogether there is every prospect of the river Tame being restored to a condition which will not be a disgrace to the district through which it runs. In similar populous districts in other parts of England, the progress in the common-sense treatment of sewage is no less marked than the Midlands.

The Birmingham works are equipped in most up-to-date fashion in every respect, the electrical plant being actuated by gas engines supplied with gas evolved from the sewage.

The engineer for this great scheme is Mr. John Duncan Watson, and amongst the electrical staff under him is a young Irish engineer, from Omagh, Mr. E. Hackett, to whom we are indebted for the bulk of the foregoing particulars.

**Carlou.**—Messrs. Thomson's tender of £178 16s. for the new vertical boiler at the Carlou Union has been accepted.



## A NEW INDUSTRY FOR IRELAND.

## Sand-Lime Brickmaking.

The high price of building material generally throughout Ireland has undoubtedly hampered the free development of the building trade, and several builders and architects in various parts of Ireland have within the last 12 months been very carefully investigating the merits of sand-lime brick-making. As a consequence, three or four plants for the manufacture of bricks from sand mixed with lime will shortly be erected. In view of this development, the following facts relative to this new industry in Ireland will be of interest to our readers:

Bricks made from lime and sand have been in use for centuries. Their chief merit lies in the fact that, like good mortar, they become harder the longer they are exposed to the weather. This hardening process is effected by the action of the Carbon-Dioxide ( $\text{CO}_2$ ) in the atmosphere acting upon the lime and the silica in the sand, thus forming a carbonate of lime of a gradual increasing hardness. In fact, mortar bricks or blocks are hardened in exactly the same way as are thin layers of mortar in a building—viz., by exposure to the air.

The reason mortar bricks or blocks made from either sand, clinker, or ashes, etc., mixed with lime, have not been largely used, is because the hardening process by exposure to the air is so very slow that the business is not profitable.

## Sand-Lime Brickmaking in Germany.

Some 26 years ago an eminent German Professor, Dr. Michaelis, invented a new method of hardening sand-lime bricks, by subjecting them to the action of steam at a high temperature, and he demonstrated that bricks could be made quite equal to ordinary clay bricks, so far as crushing strain and absorption of moisture is concerned, and that the bricks could be ready for use within 12 hours after being manufactured. The Professor patented his wonderful invention, but allowed the patent to lapse, and it was not developed commercially until some 13 years ago, when, owing to the high price of building materials in Germany, a cheaper substitute for clay bricks or stone had to be found.

Enormous tracts of land in Germany are covered with sand, and the clay brick-makers in these districts were obliged to remove it in order to "get" the under-lying clay. The cost of removal added considerably to the cost of manufacture, and this, together with the high price of fuel, formed a serious item in the production of clay bricks. Moreover, the bricks when manufactured were not of a good quality, as the clay used contained a large percentage of sand. Several works were started to make mortar bricks from this surplus sand—that is, bricks made from sand and lime, and also concrete bricks made from sand and cement.

Another development consisted in the utilisation of waste products, such as blast furnace slag, quarry waste, clinker, and ashes, etc., mixed with either lime or cement. At this stage, the wonderful results obtained by Dr. Michaelis were remembered, and experimental plants were installed for hardening sand-lime bricks by steam, but the products obtained in the first instance were not satisfactory, because the temperature of the steam used was not high enough. They were better than the ordinary mortar bricks hardened in the air, but not so good as concrete bricks made with cement. By increasing the temperature of the steam, however, excellent results were obtained, and the industry developed at such a rapid rate that to-day it is estimated that 500,000,000 sand-lime bricks are produced annually in Germany alone, and 600,000,000 in the United States of America.

In Germany, Government officials periodically inspect the bricks being made at each brickworks, and at the outset were very hard to convince as to the merits of the new brick, while the clay brick-makers petitioned the Reichstag for a law to prohibit their use, and for a time, pending a Government inquiry, their manufacture was stopped. The Commission appointed, consisting of eminent engineers and chemists, made their investigation in a characteristically "thorough" German fashion. They had small buildings erected respectively of clay and sand-lime bricks taken from the same district. These buildings were first fired, then thoroughly saturated with water, and afterwards frozen, the whole operation being several times repeated. Upon examination, it was found that the sand-lime bricks were not in any way affected by this drastic treatment, but that the clay bricks, on the contrary, were very considerably damaged.

Large plants were also erected elsewhere on the Continent, and public buildings, besides residential property,

built with sand-lime bricks, can to-day be seen in almost any Continental city.

The difficulty of the sand-lime brick manufacturer was never in the selling of the brick, but in finding suitable machinery for the rapid and economical treatment of the two materials, sand and lime. Ordinary brick-making machinery was found to be useless, and enormous sums of money were lost in attempting its use. A specially-designed system and press, called the "Hercules" Press, was put on the market, and, owing to the results obtained, has been largely adopted. This press was the invention of Mr. H. Alexander, of Holbeck Lane, Leeds, Yorkshire, whose machines still maintain their initial pre-eminence. Mr. Alexander, the pioneer in Europe of machinery for this industry, erected the first successful plant in Germany, and has supplied plants to all parts of the world, including all the leading installations in England.

## An Irish Experiment.

Experts were last year appointed by the Irish Board of Agriculture to thoroughly investigate the merits of the sand-lime bricks, together with the various systems of manufacture, with the result that a complete and up-to-date plant is now being erected in Newry, embodying all the latest improvements.

This installation, designed by Mr. Alexander, and now being erected at Newry, will be capable of producing 10,000 to 12,000 lime-sand bricks per day of ten hours. A small building is provided for slacking, grinding, and dressing the lime; this work is performed intermittently, yet automatically, and is controlled by one man. The perfect slacking of the lime is absolutely assured. From the lime-house the lime is fed by a conveyor into the hopper of a measuring machine in the large building. The sand or other material to be made into bricks is fed into another hopper beside the lime-hopper and over the measuring machine. The cylinder of the measuring machine revolves at the bottom of these hoppers, and the pockets are automatically filled by gravity with the regulated quantities of sand and lime. With some materials, and where common bricks only are required, the product from the above mixer may be fed direct to the brick-making machine; but for the manufacture of "best" bricks it is advisable to give a more thorough and complete mixing and tempering in the special solid bottom self-delivery mill. This mill will hold a charge of about 10 cwts., which may be allowed to remain under the action of the rollers and scrapers for a period of 6 to 8 minutes, when it is automatically discharged by the opening of a valve in the pan bottom, and delivered by an elevator into the Alexander's "Hercules" brick-making and pressing machine. The "Hercules" brick-making machine is designed to exert a pressure of 150 tons upon each brick if required. The action of filling the moulds, pressing the brick, and discharging the brick is performed automatically. The attendant removes the finished bricks on to suitable waggons. Each of these waggons holds about 900 bricks, and as they are filled they are wheeled into the steam hardening chamber, which should be large enough to contain from 10,000 to 12,000 bricks. At the end of the day's work the hardening chamber is sealed up, and during the night the bricks are subjected to the action of live steam at a pressure of from 100 to 120 lbs. per square inch. Eight to ten hours later the loaded waggons are discharged from the hardening chamber, and the bricks are ready for the market.

## The Hardening Process.

Steam at a pressure of 120 lbs. per square inch, or a temperature of 341 degs. Fahr., forms a chemical combination between the silica (in the sand, clinker, slag, etc.) and the lime, thus producing a silicate of lime, which is the chemical formation of ordinary sand-stone. This bond is entirely different from that in the mortar bricks, which harden only on the outer surface, since the carbon-dioxide in the air is not powerful enough to enter the interior of the brick.

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## SCULPTURE IN RELATION TO ARCHITECTURE.\*

BY S. CHARLES KAINES SMITH, B.A., CANTAB.

It is no light task for a layman like myself to address an assembly of experts upon any aspect of architecture. But, emboldened by the honour which has been done me by your Council, in inviting me to speak to you to-night, I venture to place before you the views of a theorist upon the relations between the sculptor and the architect, which you will be able to appraise in the light of practical experience. After all, counsels of perfection are means to an end, the end in this case being the achievement of practical and lasting beauty in the harmony of sculpture and architecture.

Perhaps it may be as well to assign a broad but definite meaning to the term "sculpture." By that term I shall everywhere imply the sculptured representation of natural objects in their natural form, while by "carving" I should understand the representation by the same means of conventionalised forms of ornament. More especially I propose to deal, this evening, with the use of animate forms in architectural sculpture.

If I may be allowed to give expression to a few elementary truisms, it may serve to make clearer the point of view from which I propose to regard architectural sculpture.

Firstly, then, the object of architectural sculpture is to be beautiful, not merely to be beautiful. It is, in fact, an actively, not a passively, beautiful art. It is not sufficient that a building should be beautiful in proportions, and its sculpture beautiful in form. This might be the case, without the slightest sympathy between the two, and in such circumstances the two arts would defeat one another, instead of being mutually contributive to a harmonious whole. A clumsy, ill-built, and ill-proportioned building, encrusted with the most exquisite sculpture, is not beautiful, nor is a fine architectural achievement enhanced by ill-conceived and ill-executed sculpture.

Secondly, it is of the greatest importance that the sculpture, being perfectly sympathetic in style with the building, should also be sympathetically disposed about the edifice. On no pretext must its presence be allowed to disguise, or weaken, or falsify the structural lines of the building. For it is as obvious as anything can well be, that the first beauty of a building is its strength. If that strength be disguised in the smallest degree, all ornament is nothing but an additional burden upon the apparent weakness of the building. The blank wall of a reservoir-dam is beautiful in its impassive strength, and that strength is of such paramount importance that the least ornament would be trivial and weakening in effect, unless placed at the very crest of the wall, *above the known water-line*. But sculptured figures, standing on the coping, would be perfectly permissible, even desirable, if not on too large a scale, for by their very lightness they would serve to accentuate the massive power of the dam.

Another example may be drawn from the borderland of architecture and engineering—viz., the decoration of a bridge. Here it is plain that while massive sculptures may be piled upon the spring of the arch on either bank, no free sculpture must appear over the keystones, except perhaps in the form of a small figure on the keystone itself (as, for example, in the Arch of Titus, at Rome); while over each pier the groups of sculpture which may be introduced must be pyramidal in the general scheme of their composition. The Charles Bridge, between the Mula-strana and Nove-strana, at Prague, is a good case in point.

The sculptures which may appropriately flank the approach to a bridge are free and lively compositions of broad base. The Boadicea group on the Embankment is worthy of note as a fine bridge-sculpture vily placed. It should face away from, not across the bridge, and a corresponding group should appear on the opposite side, to say nothing of a pair at the Lambeth end of the bridge. The Pont Alexander III., at Paris, exhibits well-placed groups of sculpture.

These, however, are instances of the axiomatic necessity which is incumbent upon the sculptor, of paying due respect to the structure which he is to adorn. But, as a matter of fact, his mission is a far higher one than this.

The great difficulty which retards the progress of sculpture as a means of architectural adornment, lies, not so much in the arts, as in the artists; for I must include both architect and sculptor in my mild indictment.

The mutual respect which undoubtedly does exist between the artists of both branches of beauty, the structural and the plastic—is, I fear, largely coloured by mutual distrust—a circumstance of which the immediate outcome is a lack of perfect co-operation. This lack of co-operation has for its fruit a corresponding lack of harmony between the respective provinces. I have pointed out elsewhere\* that the general impression conveyed by the sculptural figures on London buildings of recent date, is that they have climbed out on to the tops of the windows, or on to the parapets, and continue to recline upon their giddy couches because they are unable to retrace their perilous steps. In other words, they form no integral part of the buildings, which, by their mere presence, they certainly do much to adorn. This impression can only be due to the fact that these buildings could perfectly well dispense with their presence—that sculpture is not an inherent part of the design, but may be included, or omitted, according to the margin of "extras" that the funds are likely to bear. The architect feels—and often rightly feels—that his powers of design are in no way dependent upon extraneous adornment, and thus is rather inclined to regard the sculptor in the light of a rival than a coadjutor, a feeling which is bound to react upon the sculptor, and to have a detrimental effect upon his work. It is perfectly true that a building will stand as firmly upon its foundations, that its proportions may be as true, its spirit as noble, and its utility as complete, without the aid of sculpture as with it. But in one respect a building upon which no sculptured figures find a place falls short of the highest glory. It has no voice, it is silent, uneloquent of its purpose. Even a prison, whose grim soul is the very spirit of silence, may render its grimness more telling if it be sombrely enriched with appropriate sculpture.

It may be granted, then, that the use of sculpture is, at times, of actual value to the architect, and this being so, all that remains to be ensured is that such sculpture be, firstly, of the right kind, and, secondly, rightly used.

It is at this point that I would beg your leave to illustrate my remarks by the description of the most complete and perfect scheme of decorative figure-sculpture in the world—viz., the Parthenon. And in my account of its sculpture, I shall regard that monument of Athenian greatness, not so much from the purely architectural, as from the national and spiritual point of view, paying as much regard to the circumstances of its conception, and the purpose which it served, as to its actual form.

The decoration of the Parthenon consisted, as I need hardly remind you, of the pedimental sculptures, the Doric frieze of metopes, and the Ionic frieze which run along the top of the outside wall of the cella. The natural approach to the temple was towards the western front, and from this point it was open to the visitor to proceed to the eastern end and main entrance either along the southern or northern side of the temple. The most natural route would be along the northern side, straight down the central vista of the Acropolis.

Naturally, the first sculpture to strike the eye was the great pedimental group representing the contest between Athena and Poseidon for the land of Attica—a story of intensely local interest, the choice of which marked down the Parthenon as a deliberate claim upon the goddess as the patron saint of the city to which she had given her name in the far-off days. Thus the story chosen for representation brings home at once and forcibly the intensely national aspect of the goddess and her shrine, and prepares us for the general scheme of decoration, and its ultimate *dénouement*, dramatic in its simple force.

Strong and telling in the clear Attic sunlight, the vigorous relief of the metope-sculptures next claims the eye. The nature of the Doric frieze demands the representation of detached groups in a severely square frame. Thus all depend upon vigour of action and power of line and

\* Read before The Society of Architects, December 13, 1906.

\* In the *Building News*.



shadow, if the monotony of the obviously structural frieze is to be relieved without falsification. And on this principle we have a series of pictures representing vigorous action—Greek and Amazon in deadly conflict, recalling the deeds of Theseus, the greatest hero of old Athens, in the days when the gods walked the earth—and thus the local appeal of the building is further emphasised.

Lastly, the Ionic frieze, glowing with colour and gold in the subdued light reflected from the pavement within the peristyle, startles with its innovation, and carries the spectator insensibly along with it. Running from south to north, it turns the northern corner and continues along the northern side, the movement of its figures ever increasing in speed and vigour, so that the eye scarcely heeds the detached figures of the outer frieze in the irresistible charm of the onward-sweeping orderly tumult, and detail after detail, sought and recognised, goes to complete the graphic picture of the great national act of imperial worship, the Panathenaic procession, with its knights, its elders, young men and maidens, old men and children, all pressing forward, and carrying the spectator with them, till, almost as one of themselves, he turns the north-eastern corner, and stops before the very door of the holy place. And here, again, the majestic size of the pedimental group calls back the enchanted eye, to gaze upon the divine origin, the Olympian miracle of the birth of Athena from the very head of Zeus—the universal arrests and surpasses the local aspect of the goddess—and the horses of the rising day and sinking night alone can encompass the marvel. The impression deepens in the mind that the tutelary goddess of Athens is great, indeed—a goddess of might in all the world, and the eyes, dropping from their reverent contemplation, rest upon the metopes—vigorous sketches in marble of the triumph of the Olympians over the powers of the earth, the giants. The gods, indeed, are great, and Athena is chief among them.

Once more to the frieze. No longer a stream of living movement, but a peaceful circle of the gods themselves, seated and watching the approach of the great national Attic procession in the honour of her, the noblest and most spiritual of them, all. And in their midst, a priest, who hands to a little acolyte the folded robe, now to be replaced by that new garment offered to the deity by her loving and grateful people, and once more the intensely local aspect of Athena is brought home to him who reads the sculpture aright.

Lastly, the great dim portal greets the eye, and invites entrance to the sanctuary.

Enter. Leave behind you the bright, hard glare of the mid-day sun, trembling on the blue-grey limestones, and glittering Peutelic marble. At once you are plunged in the cool golden twilight that filters through the thin marble tiles, and your shadow slides before you on the pavement to melt in the soft haze of diffused light that is almost darkness to your yet unaccustomed eyes.

Look straight before you; and out of the amber gloom there grows slowly the towering form, clad in gold and jewels, particoloured of enamel and cunningly wrought metal, of the very goddess herself—Athena—Athens imperial and incarnate, the spirit of the past, the pride of the present, the hope of the future, whose calm, ivory-white features glimmer ever more clear, as her blue eyes gaze steadily out and beyond over her beloved Attica, toward the hill whence the stones of the temple wherein she stands were hewn by her devoted people. It is a climax, superb and supreme, to which the sculptor has led you, insensibly, irresistibly, because the source of his inspiration, and of that of the architect, was one and the same source, because the Parthenon without its sculptures had been a mere shell, dead and meaningless, and because those sculptures, divorced from their surroundings, could lead nowhere, could serve no purpose, and tell no story of a nation's passionate devotion.

Like Æsop of old, I must find for my parable a moral. The moral is this: that the purpose of the building must be the inspiration of both architect and sculptor, and that the two must work together to such an extent that the architect shall so design his building as to be incomplete without sculpture, even to the point of sacrificing something of purely architectural effect; while the sculptor, for his part, shall acknowledge that the mission of his work is to accen-

tuate and enhance the broad strength of the architectural forms, to lead the mind to the contemplation rather of motives than of forms, rather to the spirit of the whole than to the perfection of the part with which he himself is immediately concerned. Mutual forbearance, mutual self-sacrifice, and a common interest will, I think, soon relieve our public buildings of the spectacle presented by fair forms of stone clambering along perilous parapets, and reclining cumbrously upon giddy gables, of rows of columns obscuring ill-shaped friezes, or officious statues blocking out the daylight from all-too-modest windows. Sculptor and architect must be, not rivals, but allies, firm-knit in loyal service to stern Utility, whom they exist but to ennoble and adorn.

## ENGINEERING NEWS.

**Dublin.**—The Improvement Committee of the Corporation of Dublin are open to receive tenders for the construction of about 14 miles of pipe sewers, ejector stations, rising mains, air transmission mains, air compressing station, together with the supply and erection of various machinery and auxiliary works connected therewith, chiefly in the East Clontarf and West Clontarf Wards of the City of Dublin. Mr. George Chatterton, M.Inst., C.E., 6 The Sanctuary, Westminster, is the consulting engineer. Tenders close December 28th, 1906.

**Ennistymon.**—The Rural District Council invite tenders for the construction and completion of a combined water supply for the towns of Ennistymon and Lahinch, Co. Clare. Drawings and specification have been prepared by Mr. Brian E. F. Sheehy, 57 George-street, Limerick, and quantities by Mr. James Mackey, surveyor, 58 Dame-street, Dublin. Further particulars appear in our advertising columns.

**Howth.**—At a meeting of the North Dublin District Council, reports were received from Messrs. M'Carthy and Kaye-Parry, Ross, and Hassard, engineers, in reference to a number of tenders received for the carrying out of the new sewerage and waterworks scheme for Howth. Six tenders were received for the sewerage and eleven for the waterworks scheme. Messrs. Martin and Company, Drogheda, who tendered to carry out the sewerage scheme at £6,668 9s. 2d., were appointed contractors, their tender being the lowest. Messrs. M'Kee and M'Nally, Dungannon, tendered to carry out the waterworks scheme at £6,683 17s. 7d., and were accepted provisionally as contractors. The lowest tender was £6,240 5s. 4d.

**Limerick.**—Notice is given that the Joint Committee of the Limerick District Lunatic Asylum have applied to the Local Government Board for Ireland for the consent of the borrowing by the Joint Committee of Management for the sum of £700 to complete the drainage work at the Asylum.

**Pembroke.**—Mr. P. C. Cowan, Chief Engineering Inspector of the L.G.B., opened an inquiry in the Pembroke Town Hall into an application by the Pembroke Urban Council for permission to borrow £6,500 for the purpose of extending the electric system in the township. Mr. J. C. Manly, Town Clerk, gave particulars showing the financial position of the township, the valuation of which is £122,878, on which a penny rate would produce £512. The total borrowing powers were £508,903, and the total net debt outstanding, including the township portion of the main drainage debt, was £214,685, showing a margin of borrowing powers unexercised of £294,218. Pembroke's portion of the main drainage was £46,770, after taking credit for the sinking fund. The total urban rate at present was 6s. 7d. and the poor rate 3s. 2d., making a total of 9s. 9d. Mr. D. L. Ramsay, chairman of the Electric Lighting Committee, stated in his evidence that the number of consumers was now 363, and was increasing at the rate of about 50 per year. The works now contemplated would enable them to supply double the number of consumers and at the same time provide an efficient stand-by. Mr. Sidney L. Price, Resident Electrical Engineer, stated that since 1902, by adding a third to their capital expenditure, they had doubled their revenue from the electric lighting. The capital expenditure up to March 31st, 1906, was £50,264 6s. 11d., and the total revenue for the year 1905-6 was £3,921 2s. 7d. The present loan was for the purpose of installing a new engine, boiler, and battery, the capacity of the new generating installation to be 300 kilowatts. There was a deficit last year on the electric lighting of £614 17s. 3d., as compared with a deficit of £1,719 15s. 6d. in 1902.

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### OUR SOUTHERN LETTER. (FROM OUR CORRESPONDENT).

#### Waterworks and Sewerage Schemes.

Mr. A. D. Price, Engineering Inspector, Local Government Board, held an enquiry into the application of the Cork Rural District Council for sanction to a loan of £5,600 for the purpose of carrying out sewerage schemes for the Lough, Glasheen, Pouladuff, College and Magazine roads' districts. After evidence was given, showing the necessity for the above works, Mr. William H. Hill, jun., consulting engineer to the Council, who prepared the plans, described the engineering features of the scheme. The only point there was any discussion about was the proposed site of the septic tank and filter area. An alternative site was suggested by the representatives of the Cork Corporation. It was eventually decided that all parties would agree to any site which was approved of by the Local Government Board, and it was left in Mr. Price's hands to choose a suitable site.

Mr. A. D. Price also held an enquiry at Youghal into the application of the Youghal Urban District Council for sanction to a loan of £1,200, for the construction of a sewer from the Auxiliary Asylum to low water mark at Dolphin's Dock.

The Cork District Lunatic Asylum agreed to contribute £500 towards the cost of the sewer. Mr. Green, engineer to the Council, gave engineering evidence and described the details of the scheme.

In connection with the improved water supply to the Youghal Auxiliary Asylum, Mr. W. H. Hill, C.E., has been instructed to prepare plans and specifications for three tanks, each to contain 5,000 gallons, at an estimated cost of £500.

The Middleton Rural District Council obtained three tenders for carrying out the proposed extension of the Carrigtwohill Waterworks. The tenders ranged from £355 to £265. The lowest tender was sent in by Mr. Daniel Twomey, Rougrane, Glanmire, Co. Cork, and was accepted by the Council.

The Mitchelstown Rural District Council have adopted the septic tank system of sewage disposal, and have approved of the plans and specification. The estimated cost of executing the proposed work is about £1,250.

#### General.

The Father Bernard Memorial is now making good progress, and is taking the form of an extension of Holy Trinity Church, Father Mathew Quay, Cork, belonging to the order of Capuchin Friars.

The extension will have a length of forty-two feet, and a width of sixty feet, and the design will be in harmony with the existing building. The foundation-stone has been laid by the Lord Bishop of Cork. The contractors executing the work are Messrs. J. Delany and Co., Cork, and the plans and specification have been prepared by Messrs. Ashlin and Coleman, Architects, Dublin; and the negotiations for the purchase of the property required were completed by Mr. James F. M'Mullen, Cork, who is to act as superintending architect.

The Cork Joint Hospital Board have not yet succeeded in obtaining a suitable site for the proposed Sanatorium for the Cure of Consumption. The latest site which it was proposed to acquire was situated at Myshal, near Dripsey, Co. Cork. The owner of the property adjoining, strongly opposes the adoption of the site for such a purpose. The Cork Corporation oppose also, and state they cannot approve of the site, owing to the possibility of the water supply to the city being injuriously affected, and ask for further particulars in connection with the drainage system to be adopted.

They also enquire if there is a similar institution where the overflow, or effluent from the hospital is discharged into a river or stream, which is a source of a public water supply.

The Board, since its inception, has met with nothing but difficulties; as first the doctors disagreed as to certain sites and now they are met with the question of how to get rid of the sewage effluent, so as not to injuriously affect the adjoining properties and any neighbouring water supply.

The Board proposed to adopt the septic tank system of sewage disposal, the effluent from which would flow from the Dripsey River into the River Lee, from which the water supply of the city is obtained.

The Mitchelstown Rural District Council have applied to the National Bank for a loan of £2,726 for the purpose of carrying out the Mitchelstown electric lighting scheme.

### CONTRACTS.

#### GALWAY UNION.

#### ERECTION OF A FEVER HOSPITAL.

#### NOTICE TO ARCHITECTS AND ENGINEERS.

The Board of Guardians invite Plans and Estimates of a Fever Hospital proposed to be erected at Galway.

A prize of Twenty-Five Pounds will be given for the Plan, etc., which will be considered the best and most suitable; but, in the event of the Guardians deciding to give the Supervision of the building to the Architect or Engineer whose Plan has been accepted, this prize will be merged in his fees.

The selection will be made by an Architect or Engineer having no interest in the business.

Particulars as to Hospital accommodation, etc., required, will be furnished by me.

The Plans will be received by me up to 11 o'clock a.m. on Wednesday, 6th February, 1907.

(By Order),

ROBT. F. MULLERY,  
Clerk of Union.

Galway, 6th December, 1906.

#### ENNISTYMON RURAL DISTRICT.

#### TO CONTRACTORS.

Tenders are invited for the construction and completion of a combined Water Supply for the Towns of Ennistymon and Lahinch, Co. Clare.

Drawings and Specification can be seen on application to the Engineer, Brian E. F. Sheehy, Esq., at his Office, 57 George Street, Limerick, or at the Office of the undersigned at Ennistymon Workhouse, on any day (Sundays and Bank Holidays excepted) between the hours of 10 a.m. and 4 p.m.

Bills of Quantities prepared by James Mackey, Esq., Surveyor, 58 Dame Street, Dublin, may be obtained from him, the Engineer, or the undersigned.

Sealed Tenders, endorsed "Water Supply" (special forms to be had from me, the Engineer or Surveyor, no other will be entertained), giving the names of two solvent sureties willing to join in a Bond for the full amount of the tender for the due performance of the contract, to be lodged with the undersigned not later than 11 o'clock, a.m., on Tuesday, the 8th day of January, 1907.

A deposit of £5 must accompany each tender, which will be returned on receipt of a bona fide tender.

The lowest or any tender not necessarily accepted.

(By order),

NICHOLAS GRIFFY,  
Clerk of Council.

Clerk's Office,  
The Workhouse, Ennistymon,  
27th November, 1906.

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HEAD OFFICE

DECEMBER 29, 1906.

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## TOPICAL TOUCHES.

Mr. George Moore, in his evidence before the recent Royal Commission on Art in Ireland, said that all modern stained glass is so utterly bad, and so beastly ugly, that it is simply throwing away money trying to improve it—in fact, the sooner it dies out the better.

\* \* \* \*

In this issue we continue Mr. Hudman's series of articles on the "Industrial Resources of Ireland." In the present instalment he deals with timber in Ireland as a product and as a manufactured article. In subsequent issues he will deal with each of the chief building materials or trades.

\* \* \* \*

The building trade abroad, particularly in France and Germany, is reported to be in a particularly prosperous condition at present, which, however, is more than can be said of the trade at home, though the state of depression prevalent during the past couple of years shows an unmistakable tendency towards relaxation during the past few months, while, as previously noted, the building trade in New York is "booming" phenomenally.

\* \* \* \*

The November number of "Concrete" lately reached us, and contains some excellent articles, all relating to concrete. It is nicely produced and well written. Notable amongst the articles are the new French rules on "Reinforced Concrete," issued by the French Ministry of Public Works, and so long expected, which the enterprise of the proprietors of "Concrete" enables them to place before English-speaking readers actually before they have been publicly issued in the original French. These rules, which have been in course of preparation during the last five years, and have been awaited with great interest by all technically interested in the subject of reinforced concrete, call for your special notice.

\* \* \* \*

The application of the Dublin Corporation for sanction by the Local Government Board of a big loan for an extension of the Vartry supply was recently inquired into by Mr. P. C. Cowan, Chief Engineering Inspector of the Local Government Board, on two occasions. On the first occasion the plans were not quite ready, or had not been submitted, and on the second some modifications in the scheme were proposed. As a result Mr. Rice, solicitor, on behalf of the Corporation, suggested the adjournment of the enquiry for six weeks, a course with which the Inspector agreed. It is probable the Inspector had much fuller information before him than the general public could glean from newspaper reports, and without in the smallest degree reflecting upon the scheme which Mr. Cowan and other competent persons have stated to be an excellent and creditable one, it must be said that no very strong evidence was given as to the urgent necessity for such a large outlay at the present moment. Of course, in

common with almost every other large water-works system, there are constant complaints as to the want of pressure; but, then, of course, there are plenty of people who, if millions of gallons of hard, soft, and boiling water were delivered free to them hourly, would still complain. When the enquiry is resumed we may hope to have fuller particulars of a scheme which would apparently add much to the general excellence of the Dublin water supply system, and afford a certain amount of much-needed employment.

\* \* \* \*

Our contemporary, the "Stone Trades Journal," makes some practical and apt observations on the Irish marble trade. Our contemporary regrets "that the efforts made to introduce Irish marble into England are not made with more system and determination, and that what is wanted is a combination of Irish quarry owners who would join to keep a sufficient stock of Irish marbles at some convenient centre on the English side of St. George's Channel; that were this done, transport charges would be reduced, and a demand spring up," and goes on to say that several of the Irish marbles are unique.

\* \* \* \*

We entirely agree with our contemporary's observations; but we fear co-operative movement amongst rivals in the same trade in Ireland is almost too much to expect. Still, one or two Irish stone industries are in a very prosperous state. For instance, the Kilkenny quarries, although not exploited to the extent that is desirable, are yet getting along pretty well, while the superb green Connemara marbles from the Recess quarries, owned by Mr. Patrick Rafferty, are a most flourishing concern, thousands of pounds' worth of material being annually exported to the United States. Owing, however, to operation of the tariff laws it is not profitable to export the stone in a finished state, polished, as we are accustomed to see it. The finished, wrought and polished marble is subject to an *ad valorem* duty of, if we remember aright, 33 per cent., while the raw material may be brought in at a very much lower percentage, based on a tonnage rate; and, in spite of the inevitable attendant loss in waste, can be wrought in America and delivered finished to the consumer for far less than the stuff wrought in Ireland. This, of course, is a great loss to this country, and prevents the employment of many hands, who would otherwise be engaged in this industry.

\* \* \* \*

As a contrast to Recess, there is the splendid Merlin Park Quarry, formerly owned and worked by Messrs. Silthorpe, of Dublin, and described in our columns, has been practically derelict for years. The Galway Granite Company have lately taken them in hands. The quarries are probably amongst the finest black marble quarries in the world, and contain blocks 14 feet long and 40 tons weight, ready for working.



## TOULOUSE AND THE MIDI.

## A SUMMER HOLIDAY.

By D. W. MORRIS, Surveyor.

[CONCLUSION.]

The first important town is Dax, 10,200 inhabitants. It is of great antiquity, and was much frequented by the Romans for its hot springs. It was held by the English from 1177 to the end of the 15th century. Near Dax, at the hamlet of Buglose, the great Apostle of Charity, St. Vincent de Paul, was born; the ancestral house of the Saint is shown here, and there is a handsome modern chapel, and a pilgrimage.

## Les Landes.

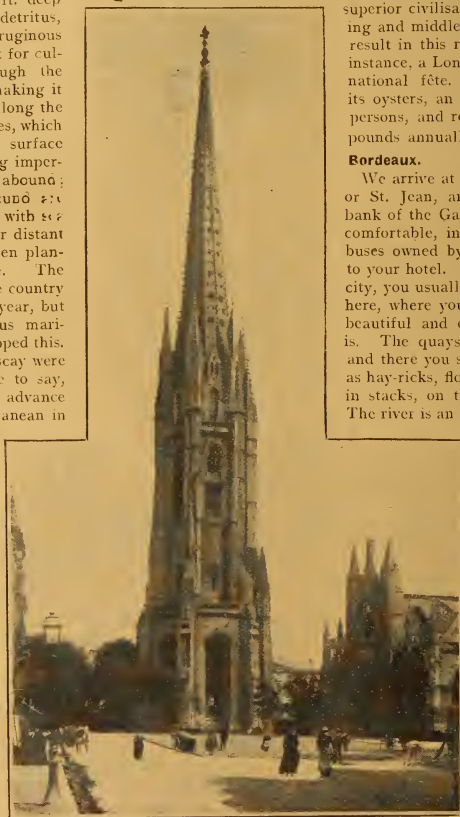
We now enter that peculiar district called Les Landes. It is nearly a level plain, about 120 miles long, and 60 miles wide, covered with about 1½ ft. deep of sand and vegetables detritus, almost solidified by a ferruginous cement, which renders it unfit for cultivation, or nearly so, though the French are improving and making it more valuable every day. Along the coast there are high sand dunes, which hinder the escape of the surface waters, and, the subsoil being impervious to moisture, marshes abound; but they and the bare ground are being encroached on steadily with pine trees, and the time is not far distant when the whole will have been planted, and rendered valuable. The sand dunes used to invade the country at the rate of 20 yards every year, but the planting of trees (*Pinus maritima*), begun in 1786, has stopped this. The waters of the Bay of Biscay were also encroaching at, strange to say, about a similar pace to the advance of the land into the Mediterranean in the Gulf of Lyons. Much can be done to check the Bay of Biscay, but the turbid Rhone will be let bring down unhindered its laden waters, as, the more land it makes, the better everyone will be pleased. The pine trees give a valuable supply of resin, which is an important article of commerce. One may notice that nearly every tree has one or two gashes on it, about 3 to 6 ft over the ground, and under them small tin vessels are placed to catch the exuding resin. The afforesting has rendered the country much more healthy, and, although it is the most thinly populated part of France, it has well repaid the outlay, timber being a useful commodity there. Several varieties of trees are grown, including oak, acacia, alantus, and cork trees. Owing to the sandy and marshy nature of the ground, the inhabitants used to employ stilts 4 to 6 ft high, to traverse the country, using a long pole as a walking stick and seat. Formerly it was a common sight to see the natives, clad in sheep skins, scouring Les Landes, with the speed of a horse at full gallop; or, supported on their long poles, quietly watching their flocks, and knitting the footless stockings peculiar to this strange country. Now, owing to roads being made, fewer marshes

and less open ground, the tourist is not likely to see much of this, and, indeed, nothing of it from the railway. As you pass along, you notice the tireless industry of the French peasant. In every clearing are market gardens, in which one may see superb melons of varied species, looking lusciously ripe and golden. On the coast is Arcachon, a charming sea-bathing and winter resort, largely frequented, and inundated on Sundays and holidays by excursionists from Bordeaux; not, however, the type of excursionists we see in these islands. All Continental nations, and the French in the highest degree, understand the art of enjoying a day in the country. The superior civilisation and culture of their working and middle classes have a very delightful result in this respect. Let one compare, for instance, a London Bank Holiday, and a Paris national fête. Arcachon is celebrated for its oysters, an industry which employs 20,000 persons, and realises about a quarter million pounds annually.

## Bordeaux.

We arrive at Bordeaux at the Gare du Midi, or St. Jean, an immense station on the left bank of the Garonne. Outside you find most comfortable, indeed, elegant, one-horse omnibuses owned by the railway, which bring you to your hotel. In driving to the centre of the city, you usually go along the quays, and even here, where you do not expect it, you see how beautiful and distinguished-looking Bordeaux is. The quays are absolutely spotless. Here and there you see piles of purple grapes, high as hay-ricks, flowers and vegetables of all sorts in stacks, on the scrupulously clean wharves. The river is an immense width, and runs in and

out very fast, something like the Mersey or Severn. The traffic on it is very large, ocean steamers coming up to the quays, and sailing thence to all parts of the world. Very soon you come to the Pont de Bordeaux, about 600 yards long, with its seventeen arches, constructed, 1810 to 1821, by the Engineers Deschamps and Billaudel. This bridge is one of the most remarkable in the world. Bordeaux is the See of an Archbishop, the seat of a University, the fourth city, and the third port of France;—one may almost say the wealthiest, and in some respects the most beautiful, city of a country that can show many rich and gracious cities. Taine says of it, "It is a sort of second Paris, gay and magnificent; amusement is the main business." The latter part of this is not exactly true, at least, it is a *suggestio falsi*. That there is plenty of amusement in large French cities is true; but to suggest that that is their only occupation is an absurdity. There are no people who work harder, or more intelligently, than the French; and that is the sole reason they have withstood so well the manifold and dire disasters they have brought upon themselves, and allowed others to bring on them. Bordeaux is a commercial hive, a place of labour, and study, and also



Photo'y)

St. Michael's Tower and Spire, Bordeaux.

(Maison Terp reau, Bordeaux.)

a city of elegance and pleasure. In its principal streets, about the Grand Theatre, and on the Quays, there is endless life and movement. In the evening to an advanced hour, the cafés, in the vicinity of the Place de la Comédie, are very crowded and brilliant, especially during fine weather which is so usual here. The Bordelais temperament is very attractive in its allied qualities. Serious and steady, yet, lively and gay, Bordeaux is a city of gourmets where the rich inhabitants of the prosperous wine districts, surrounding it, come, indeed, for their business, but also for their pleasure. They love to enjoy themselves, and they like to live well. The splendid wines of the Gironde go best when accompanied by choice food and cooking; and the Bordelais are prime judges of everything in this respect. We stayed at the Hôtel de France, where there are splendid cellars, stocking 80,000 bottles, including the best and choicest clarets. Indeed, we may admit that we never tasted anything like the white and red clarets we had in this hotel. They were simply superb. The summer and night restaurants of Cauderan, the rendezvous of golden youth and sprightly company, are lively and gay; but, like all such places, are very dear. The Landes provide plentiful supplies of game, and the sea, in various directions, an abundance of all sorts of fish, when worked as they work all these things in France. Indeed, Bordeaux is a delightful place, as, we think, can be confirmed by an Irish football team, which, captained by a young Dublin architect, goes each Easter to test the prowess of the Bordelais footballers on the hospitable banks of the Garonne.

As might be expected, Bordeaux has many fine buildings. Beginning with the Bourse, built in 1749, by the architect Gabriel, where you find goblin tapestries, and good wrought-iron hand-rails to the great stairs; then there is the Custom House, the old Hôtel des Fermes, of the same time, and a counterpart, on the other side of the square, which has in the centre the charming fountain of the Three Graces in bronze, by Visconti and Gurney. There is next, the Grand Theatre, 1773 to 1780, by the architect Louis. It is one of the finest theatres in Europe, with a theatre proper of 1,300 places, a concert hall, and a foyer. It was here the National Assembly sat in the dark days of 1871, where Adolphe Thiers was named President of the French Republic, and where the preliminaries of peace were voted by 546 votes against 107. The operatic and dramatic performances are as good as those produced in Paris. French theatres have one excellent feature in their design, which our theatres lack. The parterre is given up to the best seats, and the balconies do not project over it. This adds immensely to the effect, as the circles rise one over the other, and an effect of size and symmetry is attained.

#### St. Seurin.

The Church of St. Seurin, formerly St. Stephen, the Cathedral of Bordeaux before the 12th century, is an original building, dating from the 11th to the 15th centuries. Restorations have, however, much modified it. The front, rebuilt in 1828, masks a very curious porch of the 11th century. The rectangular chevet is of the 12th century. The two towers are Romanesque. On the south side is a rich portal of 1277, but restored. Inside, is fine modern glass, an organ of 1756, some old cenotaphs, and, in the choir, 32 stalls of the 16th century, a pontifical seat of the 15th, and a new chair, in which have been inserted fourteen precious medallions of the 14th century.

#### The Cathedral.

The Cathedral of St. Andrew is made up of a vast single nave of the 12th and 13th centuries, remarkable for its width, the immense vault covering it, and a great eastern end in the style of a northern cathedral with choir, transepts, double aisles, and chapels. This eastern end, commenced in 1300 by the Archbishop Bertrand de Comminges, and who was met before at St. Bertrand de Comminges, and who was afterwards Pope Clement V., the first Pope to take up his quarters at Avignon, is a most elaborate and interesting work—a mass of piers, pinnacles and buttresses of great elegance. The Northern transept is flanked with two exceedingly graceful spires, and although the greater part of this Cathedral was constructed during the period of the English domination, there is no trace of English influence. It was most likely intended to reconstruct the nave to

correspond with the choir, and, perhaps, in the magnificent minds of the architects, to erect a great central tower, and two western ones, which, with the two completed on the north transept and the two indicated on the south, would make a superb forest of seven spires. About 30 yards from the chevet, standing alone in a square, is the Tower, Pey Berland, 1456, of which the spire was demolished in 1793, and which holds the big bell of the Cathedral.

The Church of St. Eulalie, 12th to 15th centuries, with its lace-work spire, represents the local type of Gothic church, with three naves of nearly equal height.

#### La Crosse Cloche.

La Crosse Cloche, or Gate of St. Eloi, belongs to the ancient town House of Bordeaux, and figures on the city arms. It had, formerly, six towers, and is of ancient origin, although the actual buildings date only from the 15th century. The bell, appearing in the photograph, is the town bell. The clock on the outside dates from 1772, that inside dates from 1592, and is accompanied by a curious Latin distich. At the foot is the little Church of St. Eloi, a late Gothic building, with a nice tower, in which is a curious tri-lingual epitaph of the erudite Elie Vinet (1587).

#### The Church of St. Michael.

The Church of St. Michael is an immense building of the 15th and 16th centuries, with three naves of equal width, in the style of the Northern Gothic. Its tower, erected like that of the Cathedral, about 30 yards away, is a magnificent isolated hexagon, built in the 15th century by Jean Lebas, of Saintes. Its spire, 354 feet high with its twelve sides is the highest in the Midi. The buttresses carry six great statues of Aquitanian prelates, viz., SS. Paulin and Delphin, Pope Clement V., the Archbishop Pey-Berland, Pope Paul II., and Cardinal Arnaud de Canteloup. The spire was destroyed by a hurricane in 1768, and rebuilt in 1865. Under the tower, is a celebrated cellar, where you will find, if you care to go looking for them, a number of dead bodies collected from the neighbouring cemetery, the clay of which has the property of preserving bodies.

#### The Holy Cross.

The Church of the Holy Cross, 12th and 13th centuries, was, before 1790, the church of the principal Abbey of Bordeaux, founded in the 11th century by William the Good, Duke of Aquitaine. It is celebrated for its fine Romanesque front, restored and very freely completed in the last century by Abadie, the architect of the Basilica of the Sacred Heart at Paris. Near the church, is the elegant fountain of the Holy Cross, erected in the 17th century by the monks of the abbey.

There is a particularly fine open square, La Place des Quinconces, on the Quays, so-called, because its trees are planted in *quinconce*, or in fives. It occupies the site of the ancient Chateau Trompette, and has two high columns which serve as lighthouses. Near it, is the Monument to the Girondins, a vast allegorical conception, but incomplete, to the memory of these hapless men, who made the mistake of voting the death of Louis XVI., which was only the prelude of their own. Near at hand is the Public garden, a very delightful and fashionable fine weather resort, where we listened to the band, about 60 strong, of a French marching regiment. Amongst its members we noticed two lieutenants playing clarionets, which introduced a democratic note into the admirable music we were treated to.

#### The Roman Palace.

Close by, are the ruins of the Palace of Gallienus, the Roman Emperor, who, it is supposed, erected it. They are part of an amphitheatre of the III. century, and are very imposing, as may be seen, and give an idea of what magnificent things they did in these early days, so far from the Mother City by the Tiber. Bricks have been extensively used in those constructions.

#### The Environs.

The environs of Bordeaux are very attractive, equipped in every way, like the city itself, for a pleasant and easy life. At the mouth of the Gironde, you have Royan, a most charming watering place, which, with Arcachon to the South, gives the Bordelais a choice for his seaside holiday; but of his there is no lack in France. Then the



visitor can interest himself by visiting the famous vineyards of Chateau-Margaux, Chateau-Lafitte, St. Emilion, St. Estephe, St. Julien, and many others known to good lovers. Each town and village around will be found to hold something attractive, and always a good hotel. It is a delightful district for motoring, superb roads, abundance of repair shops, and good repairers—everything one may want to make sure the sometimes uncertain pleasure of motor touring. From here to Paris is ideal for this form of locomotion. Indeed, the motors you see in France are palatial, and are used, almost entirely, for travelling, to the exclusion of railways, no matter what the distances. Even to a foreigner who speaks little or no French, motor touring is very easy. The maps are the clearest one can see, the road indications, specially for motorists, are plentiful and easily understood, and the directions and distances are so clearly marked that one cannot go astray.

Bordeaux is a place one leaves with regret, and one wishes to go back to it. Life is so pleasant, everyone seems so happy and contented, that the stranger is infected with the *complaint*; and, when the hour for departure comes, one goes very unwillingly. Again, we are at the Gare St. Jean, to take the 11 o'clock day Rapide for the Quai d'Orsay, Paris. This train runs up at a splendid pace in seven

garden is a marble statue of Margaret of Valois, "La Marguerite des Marguerites," as someone has called her. The Cathedral of St. Peter is one of the finest churches of the style known as Aquitanian. It is, mainly, 12th century, and is credited with possessing the finest Lombard detail outside of Italy. The plan is of the cruciform type, and the design, with its great central dome, and other details, points for its ancestry to the domed churches of Lombardy. Abadie did considerable restoration here; but he was a past master in this style. In the Charente, there are many domed churches, about which the late Edmund Sharpe wrote a valuable book, "The Domed Churches of the Charente District."

#### Poitiers.

Poitiers, like Angoulême, is also perched on a hill between two rivers, and is famed for its churches, five of them ranking as a unique series of the Romanesque types, the most precious in all France. They are, St. Hilaire of the 10th and 11th centuries, the Temple of St. Jean, Notre Dame la Grande, St. Radegonde, and La Cathédrale of the end of the Romanesque period. The Museum is exceedingly rich in archaeological treasures. A learned Irish Jesuit of our acquaintance has often gone to Poitiers to

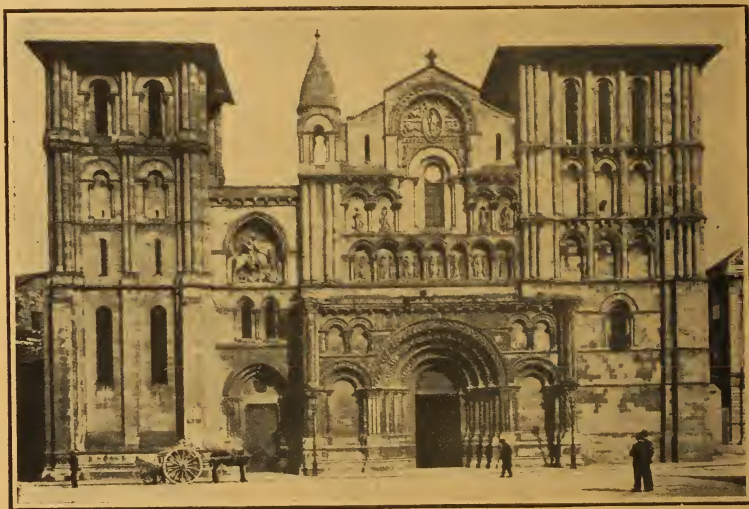


Photo by]

Church of the Holy Cross, Bordeaux.

[Maison Terpereau, Bordeaux.

hours, a distance of 360 miles. The carriages are the most comfortable and steady running we ever travelled by. Each car has a special porter, who looks after the luggage in it, sees it is in no one's way, gives you all information, and generally looks to your comfort. There is a luncheon car attached, and it is to be wondered at that in France, where the art of feeding is so finely understood, that these railway luncheons and dinners are so inferior. The reason may be, that the dining and sleeping cars are not in the hands of the railway companies. The sleeping cars are excellent, but extremely dear. Railway fares, generally, on the Continent are much cheaper than in Ireland, especially, the 1st and 2nd classes. At the present time, there is little to find fault with on the French railways. The through trains are amongst the fastest in the world, and very comfortable. *En route* for Paris we pass through Angoulême, Poitiers, and Tours, all three places in which one might spend a month with pleasure, and profit.

#### Angoulême.

Angoulême, the chief town of the Charente, the home of the brandy trade, occupies an eminence between two rivers, and the Orleans railway passes right under it. The Hotel de Ville is a very remarkable structure by Abadie. In the

discover ancient Irish manuscripts there, and utilize them in his studies and writings on the sweet Irish tongue and the Irish Jesuit fathers of other days.

#### Tours.

Tours, the capital of Touraine and Chateau-land, is a city where men and women of varied interests may find wherewith to pass many a happy hour. Architecture for the architect, Romance for the romantic, History for the historian, Pleasure for the tourist. It is the home of Balzac, who made its provincialism the object of some of his severest thrusts. In Tours, it is said, they speak the purest French, and that patois and provincialisms have no place there. St. Martin, of Tours, built a church here, and in the 5th century Perpetus, Bishop of Tours, built a larger one over the tomb of St. Martin. This, in turn, was rebuilt by the celebrated St. Gregory of Tours, and of this two towers remain, one the Tower of St. Martin, or, of the clock, and the other the tower of Charlemagne, where his wife, Luitgarde, is buried.

The Cathedral of St. Gatien was begun by Henry II. of England, in 1170, the choir being the first portion, then the transepts in the 13th century, and the facade in the end of the 15th. The latter is of Renaissance tendency; and for

charm and picturesqueness, it is said, takes rank with the best. The towers of the front are exceedingly attractive, also the strange lozenge-shaped Rose window, of which the glass is good, the drawing of the figures being exceedingly well done. The glass in the choir, however, is better. There is a marble tomb of the children of Charles VIII. and Anne of Brittany, which is believed to be the work of William Regnault, though some ascribe it to Goujon and others to his apprentice Juste.

With Tours as centre, one can visit the world-famed castles of Blois, Chambord, Amboise, Chenonceaux—the residence of Diane de Poitiers, Chinon, Loches—near where Agnes Sorel, “La belle des belles,” was born. These, in themselves, are worth going the whole way to see. There is nothing like them in the universe. Probably more has been said and written about them than about all the rest of such buildings in Europe. Art, Architecture, History—everything that can interest the mind is to be found here, and as the climate is most beautiful, and the conditions of life most pleasant, nothing is needed to fill one's cup of earthly happiness. Living is very cheap and good. By avoiding the big hotels, and by cycling, for which Touraine is splendid, one's expenses need not exceed £2 to £2 10s. a week; and, for this, one can see more from Tours than, perhaps, from any other place in France.

Then, on the way to Paris, you can take in Orleans, and Chartres, the Cathedral of the former dating from the decadence of Gothic architecture; but in the latter we have one of the grandest Gothic edifices of France, the beautiful spire of the Northern Tower being described by Ferguson as “The most elegant in Europe.” It is an adage in France that a perfect church should unite the Choir of Beauvais, the Nave of Amiens, the Portal of Reims, and the Spire of Chartres.

#### The Quai D'Orsay.

Our story now finishes at the beautiful station of the Quai D'Orsay. Formerly, the Gare d'Austerlitz, a good way to the east, was the terminus of the Orleans line. During the Commune, one of the buildings set on fire, most probably by the Versailles troops (as it was by them much of the damage was done), was the Palace, near the Pont Royal, on the South bank, used by the Cour des Comptes. This lay derelict a long time, till Paris had definitely recovered from her disasters, and then the Orleans Railway acquired it and built in its place a great central terminus. The steam locomotive is taken off at the Gare d'Austerlitz, and you are brought underground by an electric engine to the Quai D'Orsay. On our arrival, we see a magnificent train brilliantly lighted up, with beflowered tables ready laid for dinner, and asking who was coming, or going, we are told, “it is the President, *en route*, for his vineyard in the South.”

The late Max O'Rell, writing of the motto of the French Republic, “Liberty, Equality, Fraternity,” says, it is, “*un songe entre deux mensonges*.” There is, unhappily, no religious liberty for Catholics now in France; and, it must be said that she would act more in the spirit, and to the letter of equality, if she dispensed with these gilded presidential trains, and the powdered flunkies who wait in them; nor can there be fraternity where there is talk of civil war. One must not, however, look for perfection here below; and, taking her, for all in all, France is admirable in many respects—in her people and in many ways, in her high civilisation, culture and art. She is a country from which others may learn much. It often struck us how alike are the French and Irish peasants, in spite of many differences. The French peasant, thanks to his native government, and the ownership of his ground, is industrious, intelligent and never-ending in his efforts to take out of his land all it is worth. The Irish peasant would be exactly the same under similar conditions. It is true of the latter that his faults are not his own; they have been imposed on him, although, perhaps, a sterner stand on his part would have turned more to his temporal and industrial welfare. Conditions seem to be now changing for the better, thanks to the revival of Irish sentiment and spirit; and, it may be hoped, if we become truly Irish, and if the democracy of the predominant partner holds out the hand of friendship to their fellow toilers across the sea, that better times and happier days may come to Ireland.

#### TESTS OF THE FERRO-CONCRETE VIADUCT AT WATERFORD.

A short time ago we gave some particulars of the Hennebique ferro-concrete road viaduct, which has been built by the Great Southern and Western Railway Company for the purpose of diverting a portion of the main highway between Waterford and Clonmel. Commencing at the timber bridge, connecting north and south Waterford, the viaduct extends for a distance of several hundred yards along the northern bank of the River Suir. It consists of a strongly-braced frame-work and platform of ferro-concrete, supported by piles of the same material, and is of monolithic construction throughout. The viaduct was designed to carry the working load of 140 lbs. per square foot on the footpath, and the moving load represented by a 23 ton steam roller on the footway.

On November 17th two bays of the work, here distinguished by the letters A and B, were tested, the area in each case measuring 15 feet long, in the direction of the viaduct, by 30 feet wide, the latter dimension including 6 feet, the width of the footpath, and 24 feet, the width of the roadway; the deflection of each bay was measured by amplifying instruments placed on fixed supports, and carefully adjusted, so as to bring one end of each indicating lever into contact with a rod suspended vertically from the under-side of the construction at the centre of the span.

The footpath, which is carried by cantilever brackets projecting from the upper portion of the frame-work, was subjected to the uniformly distributed load of 165 lbs. per square foot, equivalent to the total load of 14,850 lbs.

In the case of the bay A, the maximum deflection of the footpath was found to be barely 0.015 in., less than 1-64th in. In the case of bay B, the maximum deflection of the footpath was indicated at 0.047 in., or about 3-64th in., but it should be pointed out that this result is unreliable, owing to the fact that the rod suspended from the viaduct was affected by the high wind prevailing at the time of the test. Still, even with the value of 0.047 in., the maximum deflection is only equal to 1-3830th of the span.

The roadway of the viaduct was tested with a moving load, consisting of two 32-ton steam rollers, driven back to back along the road as closely together as possible, the distance between the driving axles being 9 feet.

In the case of bay A, the maximum deflection of the roadway was 0.035 in. (about 1-32nd in.), while for bay B the amount was 0.051 in., a little more than 3-64ths in.

Expressed in fractions of the span, the various deflections are as follows:—

Bay.	Footpath.	Roadway.
A.	1-12000	1-5140
B.	1-3830	1-3530

Bearing in mind the fact that the usual deflection allowed for in steel girder bridges, under ordinary loading, is from 1-1500 to 1-2500 of the span, the smallness of the deflections of the Waterford viaduct is particularly striking. A still more satisfactory point is that after removal of the loads, the footpath and roadway returned to their original form, the entire absence of deflection demonstrating the perfect elasticity of the construction.

#### CONTRACT.

##### TO BUILDERS AND CONTRACTORS.

Messrs. Kapp and Peterson, Limited, invite Tenders from Building Contractors for the taking down and Re-building of their Premises, No. 111 Grafton Street, Dublin, in accordance with the drawings and specifications prepared by Geo. P. Sheridan, Esq., F.R.I.A.I., Architect, 25 Suffolk Street, Dublin, at which latter address the said drawings and specification, and the Conditions of Contract can be seen.

Bills of Quantities, by Samuel H. Bolton, Surveyor, can be obtained at his office, 19 Upper Merrion Street, on payment of a deposit of two guineas, which sum will be returned on receipt of a “bona-fide” tender.

The Tenders, enclosed in an envelope, superscribed with name of the work, are to be addressed to the architect, and be delivered to him not later than 12 o'clock (noon) on the 7th January, 1907, and be accompanied by the Bill of Quantities, priced and extended in ink, in a separate sealed envelope, also superscribed with the name of the work. The building contractor whose tender is accepted, will be required to enter into a bond for the due performance of his contract.

Messrs. Kapp and Peterson, Limited, do not bind themselves to accept the lowest or any tender.



### OUR NORTHERN LETTER. (FROM OUR CORRESPONDENT).

#### Belfast Corporation Tramways.

The first year's working by electric traction of the Corporation Tramways expired on the 30th ultimo, and the financial statement for that period, has, with commendable promptitude, already been issued. The result is highly honourable to the business capacity of the city as embodied in the Tramway Committee, and the manager, Mr. Nance—the latter, of course, most. His report, accompanying the financial statement, says:—"The first year's working of the Belfast Tramway undertaking by electric traction, shows better financial results than have hitherto been obtained by any other Corporation for the first complete year after the inauguration of electric traction;" and he gives a series of tables and resumé of facts, that proves the accuracy of his claim. The average fare per car mile run in Belfast was .4 of a penny or two-fifths. "This," the report states, "is a lower scale of fare than is charged by any other tramway in the United Kingdom, and, I believe, than any in Europe," and his deduction is that the cheaper the fare, the better the profits will be, provided one penny be the minimum fare. As the financial statement speaks for itself, contains much information in précis, and needs no further comment, I add it here. The penny fractions in parenthesis, are, of course, per car mile run.

Revenue Account for year ended 30 November, 1906—

#### EXPENDITURE.

To Traffic Expenses—			
Superintendence (.06d.)	...	...	£1,379 7 2
Wages of motormen and Conductors (.16d.)	...	...	34,607 5 4
Wages of other traffic employees (.10d.)	...	...	4,193 12 4
Cleaning and oiling cars (.20d.)	...	...	6,120 7 10
Cleaning, sanding and salting track (.04d.)	...	...	887 18 6
Fuel, light and water for depots (.05d.)	...	...	1,076 11 7
Ticket check (.12d.)	...	...	2,680 18 5
Uniforms and badges (.11d.)	...	...	2,390 17 8
Miscellaneous (.01d.)	...	...	8 1 6
Total (2.47d.)	...	...	£53,345 0 4
To General Expenses—			
Salaries of general officers and staff (.06d.)	...	...	£1,210 8 4
Store expenses (.04d.)	...	...	770 0 11
Rents (.02d.)	...	...	380 12 11
Rates and taxes (.16d.)	...	...	3,444 16 8
Printing and Stationery (.03d.)	...	...	824 6 5
Law charges (.03d.)	...	...	622 12 3
Accident insurance and compensation (.10d.)	...	...	2,249 14 1
Fire and other insurances (.04d.)	...	...	846 12 0
Miscellaneous (.04d.)	...	...	839 17 1
Total (.52d.)	...	...	£11,189 0 8
To General Repairs and Maintenance—			
Permanent way (.02d.)	...	...	£500 10 1
Electrical equipment of line (.10d.)	...	...	2,227 12 10
Building and fixtures (.02d.)	...	...	427 10 7
Workshop tools and sundry plant (.01d.)	...	...	103 9 11
Cars (.05d.)	...	...	14,166 12 10
Total (.80d.)	...	...	£17,434 16 3
To power (.89d.)	...	...	£19,321 10 1
Total expenditure (4.68d.)	...	...	£101,290 7 4
To balance (being gross profits for year) (3.46d.)	...	...	74,912 19 5
Grand total (8.14d.)	...	...	£176,203 6 9
INCOME.			
By traffic revenue (8.00d.)	...	...	£173,014 11 2
Advertising on cars (.06d.)	...	...	£1,400 0 0
Mail service, G.P.O. (.03d.)	...	...	650. 0 0
Sundry revenue (.05d.)	...	...	1,138 15 7
	...	...	£3,188 15 7
Grand total (8.14d.)	...	...	£176,203 6 9

### NET REVENUE ACCOUNT. EXPENDITURE.

To contribution to General Purposes Fund (.41d.)	...	...	£8,961 14 2
Interest on Debentures (.09d.)	...	...	1,995 0 0
Dividends (1.49d)	...	...	32,142 0 0
Sinking Fund (.92d.)	...	...	10,851 0 0
	...	...	£53,988 0 0
Income tax (.06d.)	...	...	1,262 7 0
	...	...	£64,212 1 2
Balance (being nett profit) (.53d.)	...	...	11,533 12 7
Total (3.50d.)	...	...	£75,745 13 9
INCOME.			
By Balance from Revenue Account (3.40d.)	...	...	£74,912 19 5
Bank interest (.04d.)	...	...	832 14 4
Total (3.50d.)	...	...	£75,745 13 9

The tramway undertaking has temporarily at least, and it is to be hoped, permanently, come through a serious menace—attemped domination by labour interests. So far as I am concerned, I have always sided with labour when suffering from any inequitable burden. But, in this instance, the labour interests claim too much, and are condemned by the practically unanimous public opinion of the city. During the twenty odd years that Mr. Nance managed the private Tramway Company there were no labour troubles on the undertaking. But since he became a servant of the public there has been an insidious and determined effort to get him under the thumb of the labour organisations—fostered and furthered by the labour members of the Corporation, though, it is believed, otherwise initiated. The menace of municipal trading is the employment, at the instance of Corporation members, of over-paid or inefficient labour in acknowledgment of support at the polls. Mr. Nance is a strong man, and, as a condition of his accepting the managership, asked for wholly independent control of the tramway staff. This, in a modified form, was conceded him—that is, he was to be subject only to the Tramway Committee of the Corporation, and not to the Corporation as a whole, it being written between the lines that his employment and dismissal of staff was only to be interfered with for some very special and clamant cause. Until quite recently, the Tramway Committee have been wholly loyal to him. But the pressure of labour agitation became very great, and brought forward a list of alleged inequalities and injustices—such as arbitrary and wrongful punishment and dismissal of men. Through what can be only considered weakness, the Committee undertook to adjudicate on these complaints—a tacit questioning and distrust of the managership. It was an action such as no board of directors would have taken—an impeachment of their manager by his subordinates. As encouraging rebellion, it was a mistake in principle. But in result, the Committee have kept right, for, after full investigation, the manager has been proven justified, and the labour case dismissed. During the controversy, the Lord Mayor (Sir Daniel Dixon, Bart., M.P., P.C., etc.), also came out as a strong man, and his conduct has met with very general and very express approval of the citizens. It is to be hoped that the attempt by labour to coerce the management of the tramway undertaking will not be renewed.

#### Executive Sanitary Officership.

Mr. Conway Scott, C.E., has resigned the Executive Sanitary Officership of the city, through ill-health. I have not yet heard who is designated for the billet.

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## "1906."

For the third time in succession we have, at the close of another year, to chronicle a period of peculiar and exceptional depression in the Irish building trade, and amongst engineers, architects, and contractors generally. Happily, the prospects before us are distinctly less gloomy than they were twelve months ago, when matters could scarcely have been worse or the outlook blacker. At the close of another year we have again to thank our readers for unflinching and generous support. Entering the forty-eighth year of its existence, the old IRISH BUILDER has some grounds for congratulation in that it has survived for nearly half a century the vicissitudes of fortune during a period which, in Dublin alone, has seen the rise and fall of many a journal and magazine, and this, thanks to our readers, ever appreciative during that long period of our few poor merits, and wonderfully indulgent to our shortcomings. Before another issue appears a new year will be upon us, and with our thanks for past favours, we cordially wish our readers, one and all, a happy and a prosperous New Year.

The past year has been, politically and otherwise, an eventful one, witnessing important events; but in the Irish contracting world there is but little of any great magnitude to chronicle. Everything has been very quiet, and little business stirring. The number of buildings of any importance begun or completed during the past year has been unusually small.

With the advent of a Radical or Liberal Government in the early part of the year, there was a prospect of legislation favourable to trades unionism, because of the influential numbers in which labour members were returned to Parliament, and so it has proved. The famous "Taaf Vale" decision had made the trades unions liable for the losses which employers might suffer through the concerted action of employees, and

had placed their accumulated funds at the mercy of the courts in measuring and determining the effects of such agitation, and as a result the Government produced the Trades Disputes Bill, which legalises and regulates combinations of workers who are now entitled to exercise "moral suasion" to an extent previously impossible. The force and vigour with which the claims of the workers for this revolutionary change was advocated, left both Lords and Commons but small alternatives to passing the measure. Employers of labour naturally opposed it, but in the good sense and moderation of the working classes in using this powerful weapon wisely and well we now, perforce, set our hopes. This is not a political publication; hence we may not enter upon the political aspect of the case, but must content ourselves with hoping that the fears of many employers may prove groundless, and that the promises and declarations of the labour members may be more than realised. The worker has not the good things of this life in the same measure as the capitalist; but, nevertheless, he has his responsibilities, too, and should use his power moderately, and, like other men, with great restraint.

During 1905 and the earlier months of the winter of 1906 much distress and want of employment amongst working classes existed. Happily this state of affairs has improved since the end of last year, and things look decidedly brighter, though many industrious, good workmen still lack work, and Distress Committees find their hands full. The Dublin Corporation has adopted the Unemployed Act, and the majority of its members hope to confer benefit by its operation, an opinion, however, contradicted by a substantial minority, who regard the Act as mere trifling with the question.

Few new buildings or engineering works of magnitude are in progress in Dublin at the close of the year. On the other hand, there have been no strikes or lock-outs to mar the harmonious relations of employer and employed during 1906.

The only building of any great importance in progress in Dublin during the past year has been the new College of Science and Government Offices in Upper Merrion Street, which, however, even yet, has not been properly started, the operations so far consisting of preliminary work. The International Exhibition buildings have, however (though but of a temporary character), and entrusted to an English firm of contractors, afforded employment to a large number of workers, and those responsible seem to have fully established the fact that they are, as far as possible, employing local labour, both skilled and unskilled.

During the past year a number of members of the Institution of Clayworkers visited Ireland, and in the building world the chief event was the visit of the members of the National Federation of Building Trades Employers, who held their annual Congress in Dublin, and were hospitably entertained by the local Association of Master Builders in a manner fully upholding the ancient reputation of Ireland for good-fellowship.

Engineering works of importance have been few. A large scheme for the improvement of the port of Drogheda and several branch or connecting railway works have been mooted, but have not yet reached realisation. The great main drainage works of Dublin were formally completed during the past year, although practically finished before 1906, while the municipal electric lighting system of Dublin has been proved, we are only too glad to say, more successful and remunerative to the ratepayers than many critics, ourselves included, had hoped for, and more recently the Corporation of Dublin promoted a big scheme, which, however, is but in the initial stages, for increasing and improving the splendid waterworks system of the metropolis.

Government has made a free grant for the conservation and improvement of Wicklow and Arklow Harbours, but work has not yet begun.

The falling in of the Dublin Corporation leases in Grafton Street and elsewhere has led to some building operations in those quarters; but, generally speaking, building work is anything but general in the metropolis, in Belfast, Cork, and the larger provincial towns. The Belfast Town Hall, generally esteemed one of the finest municipal edifices of the past half-century, was formally opened by the Lord Lieutenant last August, and the architect, Mr. Alfred Brummell Thomas, was amongst those made the recipient of a knighthood on the occasion of the "Birthday honours." Speculative building both in Dublin and Belfast is not active. The Catholic Church in Ireland, which for the past half-century has been the chief patron of building enterprise, has during the past couple of years greatly curtailed its efforts, little ecclesiastical work of any importance being undertaken during the last year. "Carnegie Libraries" have been erected here and there throughout the country.

The extension of local government has caused a good deal of activity in regard to sewerage and water-works schemes, and it is safe to say that in another few years few towns of any size will be without modern and efficient water supply and drainage systems.

The passing of the Irish Labourers Act of 1906 has marked formally in an increased measure the recognition by the State of the principle that the establishment, and maintenance of a healthy, prosperous, and contented peasantry is the very first essential of a nation's greatness. One of the chief disabilities the Irish rural labourer has suffered from in the past has been the want of cheap, decent, and healthy housing accommodation. Various Acts have since 1883—twenty-four years ago—been passed with this ideal in view, culminating in the Act of 1906, which places as an Imperial grant the sum of  $4\frac{1}{2}$  millions sterling at the disposal of the rural district authorities of Ireland. It is of interest to architects to note that for the first time in the history of the dealings between their profession and the State, regard is had to the professional attainments and qualifications of the persons entrusted with the spending of public money, and the design of structures built with public funds. Advocates of "Architectural Registration"—that is to say, the compulsory registration and inspection of those claiming to act as architects—say that therein the principle of registration is recognised, and that the "thin end of the wedge" may be said to have been inserted. The question of registration of architects is a large one—so large that we cannot here enter upon it; but it does seem as though current events call for some restriction. The enormously increasing numbers in which young men, tolerably well qualified, present themselves to Engineering and Architectural Societies and to Universities and Colleges, claiming admission or qualification to practice, points to the need for some measure which will put a limit upon a number of those practising their callings, if they are to gain a living by honourable and professional methods and usages.

## COMMENTS.

### The Stone for the New College of Science.

In an evening contemporary there recently appeared an account of an interview with Mr. George Watson, of Watson and Co., the proprietors of the Doonafore and Mountcharles Quarries. Mr. Watson raises the important point of what stone is to be used for the new College of Science and Government Buildings now begun in Upper Merrion Street. "Shall the stone be Irish or imported?" asks Mr. Watson, and it is scarcely conceivable that there should be any doubt on the subject. In Ireland we have some of the finest

building stones in the world, and that there should at this time of day be any question of importing stone for so important a building is incredible. True, in our great building period of the eighteenth century many of our most important buildings were constructed of Portland stone—in fact, it was almost invariably used; for instance, in Trinity College, the Houses of Parliament, the Custom House, the principal residences of the nobility, and so on; but that is no reason for using it to-day. Within more recent years Mountcharles stone was effectively and largely employed in the new National Library and Museum of Science and Art in Kildare Street, designed by Sir T. N. Deane and Son, while Mr. Watson repeats the somewhat unsubstantiated theory that the Monasterboice Cross is of Mountcharles stone. It has often been propounded, but never satisfactorily proved.

Asked what were the principal factors which militated against the greater use of Mountcharles stone, Mr. Watson answered:—"In the first place, there was that of labour, for I made it a rule to employ local labour. After that came the difficulty of transit, and that of getting over the prejudice which exists in the minds of Irish users of stone against Irish materials. They think no good thing can come out of Ireland. Curiously enough, this prejudice is strongest in the minds of the majority of Irish architects, who do not believe that even if they specified a particular Irish stone that they will get their deliveries rapidly enough to enable the buildings to be erected as they wish. Of course," he added, "the trouble of transit has been the grave of almost all the disastrous quarry undertakings in this country."

Reverting to the question of the stone to be used for the College of Science, Mr. Watson remarks:—"For three years," he said, "I have been trying to ascertain what stone they are going to use for the building. In the first instance, the Department of Agriculture said it had nothing to do with the matter, that they left it in the hands of the architect. The Board of Works and Sir Antony MacDonnell said the same thing when approached. Sir Aston Webb, the architect, declined to say anything. For the last three years he has persistently refused to answer our queries and will not reply to letters. Questions have been asked in the House of Commons on a number of occasions, but every reply given was evasive."

"For instance," he went on, "a short time ago they stated that the designs were not yet complete, and they could not say what stone would be used yet. At that time a very important portion of the designs had been published in the 'Builder's Journal.' I am satisfied that Portland stone has been specified by Sir Aston Webb, as far as he is concerned, for the tracings, and that that is the meaning of all these evasions. It seems very hard for Irish products to get fair play in Ireland."

Of course, it is perfectly well known that the architect for every large work—and oftentimes in the case of a small work—is absolutely inundated with communications from the makers of every conceivable kind of product, occasionally utterly unsuited for the work in hands. We know one architect who says he was besought to specify So-and-So's laundry machinery for a church he was building, and somebody else's stained glass for some labourers' cottages he had in hand, and if a busy man were expected to reply to all such communications, the State should pension him, and give him a good clerical staff to help him, as he certainly would have no time to attend to the ordinary work of an architect. But this is all by-the-way, and we merely mention it to show that too much should not be inferred from an architect's silence in such cases. Still, we hope that Sir Aston Webb may see his way to specifying an Irish stone, and that public opinion will keep the matter in the light of day.



### The Royal Hibernian Academy.

A letter has been published in the daily Press intimating that, in addition to the meeting of the Royal Academicians held to protest against the report of the majority Commission, another meeting of persons unconnected with that body, but interested in matters relating to art in Ireland, has been held for the purpose of organising a petition to Parliament.

The following are the terms of the two alternative forms of petition suggested:—

#### I.

That we, the undersigned artists, unconnected with the Royal Hibernian Academy and others, beg to enter a strong protest against those recommendations of the majority of the Committee of Inquiry into the Royal Hibernian Academy and the Metropolitan School of Art, which are aimed at depriving the Royal Hibernian Academy of its academic functions, as this must inevitably tend to its abolition and to the discouragement of Art in Ireland.

We consider this to be a most untimely proposal at a moment when so much independent effort is directed to the development of Art in our country.

#### II.

That we, the undersigned Art teachers and students of Ireland, desire to protest strongly against the proposal of the majority of the Parliamentary Committee to deprive students of the Fine Arts of the free place of study provided by the Royal Hibernian Academy.

We cordially welcome the idea that the teaching in the Metropolitan School of Art be re-organised and improved, but feel that such a training school can in no wise take the place of a free studio open to all advanced students and young artists who are fit to pursue an independent course of study.

We regret that it has been thought advisable to recommend a course of action distinctly prejudicial to the one really National Art Institution in Ireland.

In advocating this petition, the promoters quote the observations of the Secretary of State for Scotland when the liberality of the Government displayed towards Scottish art institutions was challenged, and Mr. Sinclair was able to say that:—

"He considered that the Treasury had not been extravagant, but generous (cheers), and expressed the hope that the new arrangements would encourage and stimulate the interests in Art and Science in Scotland."

Captain Sinclair's words are no more than the truth, and Irish artists will not grudge the "Land o' Cakes" its good fortune, but hope for similar fair treatment for this country.

One of the most interesting, and certainly amusing, witnesses examined before the recent Commission was Mr. George Moore, who poses much as an art critic. How far his pretensions are well founded we cannot say; but, at all events, he has the artist instinct in him, and under a good deal of nonsense that he talked there was a good deal of truth, and we fear that with regret it must be admitted that we are not an artistic nation; distinctly not, and as he pointed out these things, the artistic temperament and influence in a nation seems to rise and fall spontaneously, as it were, and he instanced the great painting period of Italy, in which country nowadays, in spite of settled Government, peace, and the splendid traditions of the past, there is not a tolerable home designed. All artistic impulse, he said, had now for centuries past come from France, where it centred and germinated. He drew a gloomy picture of the prospects of art in Ireland in the future; but said, in effect, whatever you do for art in Ireland, do it for the Hibernian Academy, which is, at least, an institution of painters. The Metropolitan School of Art he pronounced utterly useless, and the £4,000 a year which it costs to maintain, a hopeless waste of money. The maintenance of a true painting school, and the wherewithal to keep it going, would seem to be the prime need if we are to maintain even the semblance of art in the country.

### ROYAL HIBERNIAN ACADEMY.

In the House of Commons, Mr. Boland asked the Prime Minister, whether his attention had been called to the report of the Committee of Inquiry into the work carried on by the Royal Hibernian Academy and the Metropolitan School of Art, Dublin; and whether, in view of the fact that this Committee was appointed as a result of a debate in this House on the 10th May, 1905, and that some opportunity of considering the report should be given to this Parliament before the Estimates for next year are presented, he would give facilities for a discussion on the subject at an early date.

Sir Henry Campbell-Bannerman—Yes, sir, my attention has been called to the report, and I quite appreciate its importance, but the hon. member will, I am sure, quite understand that it is impossible to promise an opportunity for its discussion.

### "CONCRETE."

The new journal, *Concrete and Constructional Engineering*, devotes its fifth issue mainly to the application of reinforced concrete construction, the application of which is extending with the utmost rapidity.

Most important in the November number is a full translation of the French Rules on Reinforced Concrete, just about to be issued by the French Government. *Concrete and Constructional Engineering* presents these rules in full, and, seeing that the whole of the technical professions have been waiting for these rules for several years, it is in itself a matter of interest that they should first see light in the English language and in a British journal. They are of far-reaching importance, and will probably serve as a model in many other countries, including our own.

The evolution of reinforced concrete in Germany is described by one of the German Government engineers.

Mr. Noble Twelvetees, M.Inst.M.E., presents an important, well-illustrated article on reinforced concrete bridges, including a charming example from Mexico.

The waterproofing of fortifications is an article that should interest not only the military engineer, but all concerned in making buildings watertight.

A scientific discourse on the setting of cement, by Prof. Gary, should interest cement makers and cement users alike, but of more popular interest is an article on Fictitious Portland Cement, showing the difficulties the British manufacturer has to contend with, owing to the importation of spurious imitations of that material under fictitious "British" labels.

A number of new buildings are profusely illustrated, including the fortified works at West Hartlepool, some foundation work at Rainham, an aquarium building at Milan, and a silo in Germany.

Those interested in agriculture will find the application of concrete for fence posts fully described, and the scientist will read much as to tests, both in respect of loading and fire.

The journal is published at 57 Moorgate Street, London, E.C.

### IMPORTS. PORT OF DUBLIN.

Dec. 12, per Malin Head, from New Orleans, 82 pieces pine, to order; per Lady Martin, from London, 800 sacks cement, T. Dockrell, Son and Co., Ltd.; 600 do., do, Wallace Bros., Ltd.

Dec. 15, per Sunrise, from Bridgewater, 168 tons bricks, E. and J. Burke; 2 tons bricks, to order; per Florrie, from Bridgewater, 150 tons bricks, T. Archer.

Dec. 19, per Aladdin, from Ghent, 9,111 bags cement and 2 cases limestone, to order; per Lady Roberts, from London, 800 sacks cement, Agnew and Co.; 700 do., do., T. Archer; per Lady Wolseley and Lady Olive, from London, 1,000 sacks cement, T. Dockrell, Son and Co., Ltd.; 600 do., do., Mossell, Mitchell and Co., Ltd.; 344 slabs marble, E. S. Glanville.

Dec. 20, per Harrier, from Bangor, 185 tons slates, T. and C. Martin, Ltd.; per Richard Fisher, from Rochester, 300 tons cement, A. Agnew.

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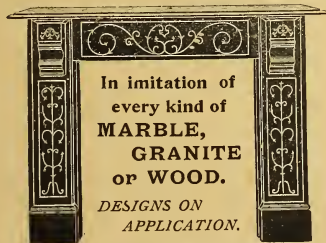
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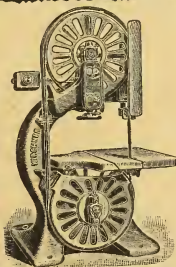
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## LAW CASES.

**Sale of Miniatures.—Action by Messrs. Butler.**

In the King's Bench Division, before Mr. Justice Boyd, in the case of Butler, Ltd., v. Foot.

Mr. Thomas Harrison (instructed by Messrs. H. and J. Moran) applied on behalf of the plaintiffs, dealers in antiques, carrying on business in Abbey street, Dublin, for an order for interrogatories to be administered to the defendant, a clerk in the Bank of Ireland. The action was brought to recover damages for breach of warranty and false representations with respect to the sale of two miniature paintings which were represented as having been painted by Comerford, the eminent Irish artist. The miniatures, counsel stated, were alleged to be portraits of a lady named D'Olier, from whose family D'Olier Street, Dublin, took its name. The defendant denied that he made the representations mentioned, and alleged that the plaintiffs purchased the miniatures, relying on their own judgment as experts.

Judge Boyd granted the application.

**Ancient Lights in St. Andrew Street.**

In the Rolls Court, the hearing of the case of Wm. O'Connor v. J. H. Walsh was resumed. Plaintiff, who trades as Wm. O'Connor and Sons, 18 St. Andrew Street, seeks an injunction to restrain the defendant, who is an insurance agent, of Trinity Street, from interfering with and obstructing plaintiff's ancient lights. Plaintiff claimed as ancient lights the skylight over his cutting-room and the skylight and two windows of his fitting room, both on the north side of his premises. Defendant's premises abut at the rear on the north side with plaintiff's premises, and he complained that in February, 1906, the defendant built a small wooden projecting structure at the rear, which, plaintiff alleged, materially diminished the access of light and air to the cutting and fitting rooms, and otherwise caused a nuisance.

Defendant denied that these lights were ancient lights, or that the structure erected by him materially diminished the access of light and air to the skylights.

At the close of Mr. Chaytor's address on behalf of the defendants,

The Master of the Rolls said he thought it would be advisable for him to visit the premises himself in as good a light as possible. So he would be there on the following morning at 10.15 a.m.

**Quantity Surveyors' Fees.**

In King's Bench Division, before Mr. Justice Johnson, in the matter of Messrs. Beckett and Medcalfe v. Argylls (Ireland) Limited,

Mr. W. H. Brown (instructed by Mr. J. H. Callan), for the plaintiffs, applied *ex parte*, for an order that the defendant should give discovery of documents in this action, and also for liberty to interrogate the defendants. The action was brought for £106, for work done and money paid by the plaintiffs for the defendants at their request, and damages for breach of contract. The plaintiffs were quantity surveyors, and the defendants employed plaintiffs to take out bills of quantities in respect of a contemplated factory for the defendants in Pitt street, Dublin, at a cost of one and a half per cent. After the quantities were taken out by the plaintiffs for the defendants, tenders were invited, but subsequently defendants altered their arrangements and plans by omitting a portion contained in the original plans, and employed the plaintiffs to reduce the quantities by omitting the top storey and other matters. Subsequently the defendants invited other tenders, and accepted a tender at £1,700. The plaintiffs claimed their percentage on the original plans—before alteration—and the defendants had tendered to them before action brought the sum of £34 on the basis of the £1,700 tender. It was stated in the plaintiffs' affidavit that the buildings originally contemplated, upon which the plaintiffs had done their work in taking out quantities, were buildings which would have cost £4,000 or £5,000; and the plaintiffs sought to be paid upon the original basis of the plans first submitted to them.

Mr. Justice Johnson gave liberty to interrogate; and also directed that the defendants should make discovery by their secretary.

**A Cork Building Case.**

Before Mr. Justice Madden and a common jury, a case of Cotter and another v. Murphy and another was heard. The plaintiffs, John Cotter and James Cotter, builders and contractors, Bantry, sued the defendants, Wm. M. Murphy and Benjamin O'Connor, who are also contractors, to recover £96 10s., balance alleged to be due for work done. It was stated that in 1905 defendants secured from the

Congested Districts Board a contract for the erection of a house in Glengarriff. The amount of the tender was £300. It was also stated that the defendants, who sublet the contract to the plaintiffs for £275, got the full amount of their contract from the Congested Districts Board under the certificate of the Board's architect. In addition to the £275 the plaintiffs claimed £10 in respect of extras. Defendants disputed the amount claimed for extras, and set off a sum of £69 3s. 3d., alleged to be due by plaintiffs under a promissory note, and for goods.

Messrs. Fleming, K.C., and Geo. M'Sweeney (instructed by Mr. J. Travers Wolfe), appeared for the plaintiffs; and Mr. William Sullivan (instructed by Mr. James Flynn) for the defendants.

The jury found that there was £89 16s. 6d. due on the contract, and that plaintiffs had not agreed that both of their debts should be set off; but it appearing that John Cotter was entitled to £37 8s. 3d. of the total amount, and James Cotter to £52 8s. 3d., judgment was given for the former for £37 8s. 3d., he paying to the defendants £13, the amount owed by him, and judgment against James Cotter for £55 11s. 7d., against which he got credit for the £52 due on the contract.

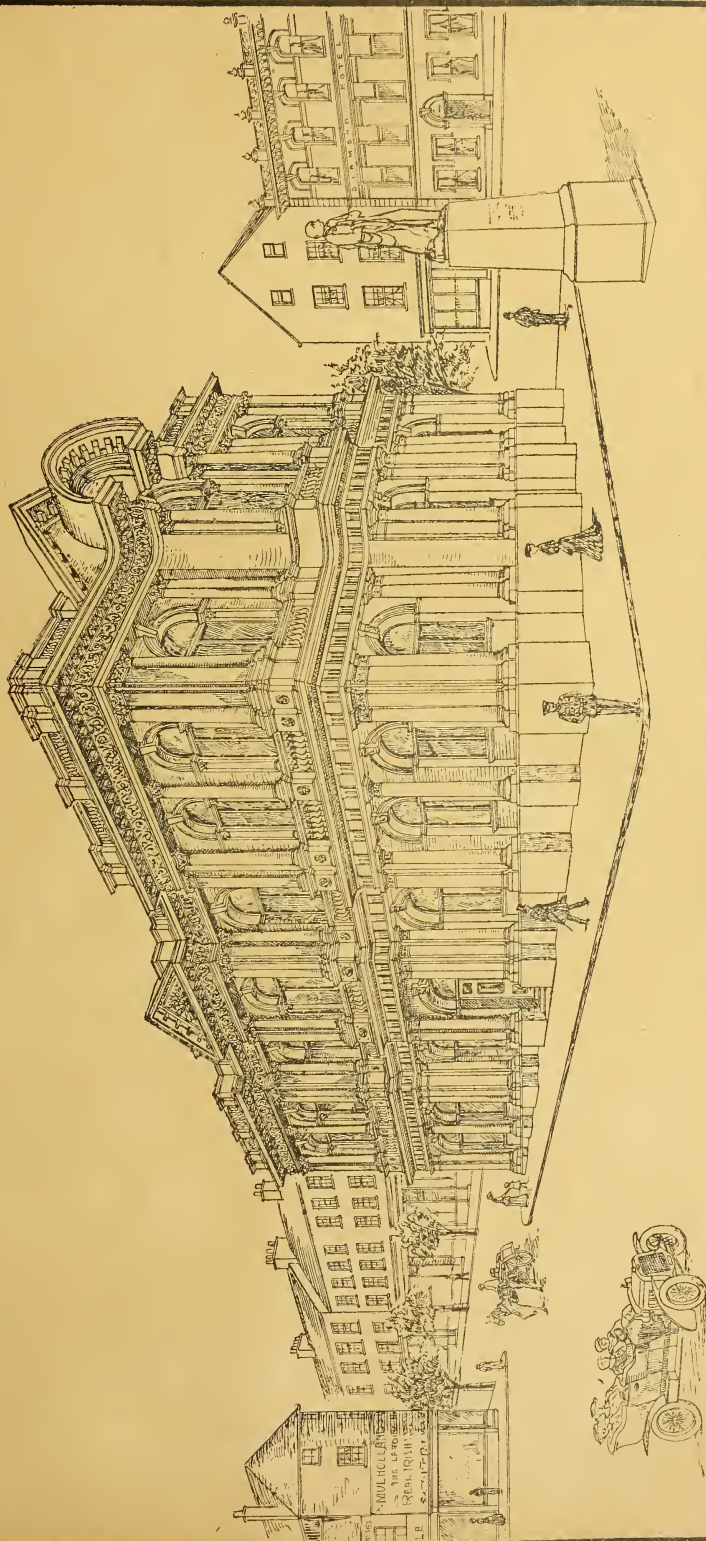
**CARNegie PUBLIC LIBRARIES IN IRELAND.****A New Library for Derry.**

During the past couple of years quite a large number of public libraries have been either begun or completed. These have ranged from comparatively imposing buildings, costing several thousands of pounds, to quite small village libraries, built at a very modest charge. Amongst the various libraries built are several in Belfast (some of which we have illustrated), the Limerick Library, Blackrock, etc., etc.

The latest is one at Derry, which has been designed by Mr. M. A. Robinson, M.R.I.A., and which we are now, thanks to the courtesy of our contemporary, the *London-derry Sentinel*, able to illustrate. The site is a rather good one, in "The Diamond." The building is in the style of the Italian renaissance, and occupies a space of 102 ft. x 61 ft., and will contain the following accommodation:—Large news-room, magazine-room, boys' and girls' reading rooms, lending library, communicating with the book stores by a small lift; large reference library, ladies' reading-room, and librarian's office.

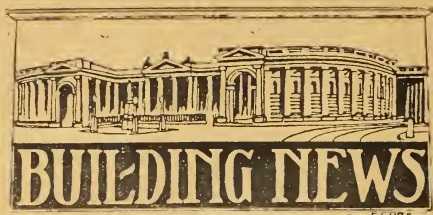
Apartments will also be provided for the caretaker. The main entrance faces Ferry Quay Street, and leads into a spacious entrance-hall, from which the ground floor reading rooms are entered. A wide staircase leads to the upper floors.

The provision of such accommodation as this in important provincial towns must inevitably prove of considerable utility to the general public, whatever doubts may be cast upon the literary tastes of the general public, which, it must be confessed, do not usually reach a very high level. There must, nevertheless, be in every town a small, but not insignificant, percentage of persons who will use a library for purposes of instruction and study, especially in any town where there are students of University colleges or secondary schools. No person, for instance, can enter the National Library in Dublin without being impressed with the fact that the most of the readers are students (in one sense or another), and use the place wisely and well, having access to many expensive books of reference, which many of them could not possibly afford to buy. Moreover, even if a large proportion of readers are persons whose natural tastes would incline them to indulge voraciously in the most trashy of fiction, it is difficult to see, granted an intelligent and discriminating librarian, or reading committee, that any moral evil could result, while it is rather mediæval to suggest that the reading of good fiction can be detrimental to any intelligent, healthy-minded person's moral fibre. The use of good fiction is a great boon and relaxation to many a tired, over-worked clerk or mechanic, and affords him a means of harmless recreation, which the rich can provide an alternative for by means of sport, travel, and the circulating library. Some of the greatest men of our time delighted to find recreation in novel-reading. Bismarck rejoiced to read Gaboriau's novels, while the late Lord Salisbury's favourite modern work of fiction was that healthy and finely-written book of Robert Louis Sephenston's, "Treasure Island."



CARNEGIE PUBLIC LIBRARY, IN THE DIAMOND, LONDONDERRY.  
Reproduced from the drawing submitted to the Corporation by the Architect, Mr. M. A. Robinson, M.R.I.A.I.





**Clare.**—**ASYLUM BUILDINGS.**—At a meeting of the Clare County Council, Mr. Blackhall, J.P. (Chairman), presiding, Mr. P. E. Moloney moved that the application of the Committee of Management for the erection of new buildings be considered and finally disposed of, the report of the Royal Commission having been published. He pointed out the congested state of the asylum, where there were 420 inmates at present. They could not transfer any of the harmless lunatics to the workhouses, so that it became absolutely necessary to either go on with the extension or to acquire one of the workhouses in order to provide proper accommodation. On the suggestion of Mr. Hogan, it was decided to have the matter come up as special business at the next meeting.

**Dublin.**—A handsome entrance sweep, with granite wing walls and cut stone piers, wrought iron double gates, and side wickets, is to be erected for P. J. Kennedy, J.P., Rathcore House. The granite is to be supplied by Mr. M'Evoy, of Ballyknocken, and Messrs. J. C. M'Goughlin have received the order for the ironwork. The architect is Mr. J. F. Fuller, F.S.A., Brunswick Chambers, Dublin.

Extensive additions and alterations are at present being carried out at Messrs. Switzer and Co.'s premises in Wicklow Lane, by Mr. Robert Farquharson, 60 Jones' Road, Dublin, from the designs and under the supervision of Messrs. Donnelly and Moore, 10 Nassau Street.

**Drumcondra.**—It is proposed shortly to erect a new building suitable to the requirements of the parish, and to transfer the school to it. This erection of the building and the purchase of the site will probably cost nearly £1,000.

**Milford (Co. Donegal).**—Tenders are invited for the erection of a Manse in Milford, County Donegal. The architect is Mr. John M. Robinson, 7 East Wall, London-derry. Tenders to be delivered to R. M'Causland, Esq., Milford, the 7th January, 1907.

**Pembroke.**—On the motion of Mr. Beckett, reports were approved of from the Public Health Committee of 16th and 30th November, recommending on the reference of the Council of 12th November, dealing with sites and other matters in connection with the erection of artisans' dwellings and underground convenience in the Ballsbridge District; that the Council proceed to acquire, otherwise than by agreement, if necessary, the parcels of land known as Beatty's Field, Dodder Bank; plot, Shelbourne road, adjoining St. Bartholomew's School; Church lane, Donnybrook; old mill and paddock adjoining River Walk at rear entrance to Pembroke Cottages, Donnybrook; angle plot at one side of front entrance to said cottages and house at other side of said entrance, this to improve existing entrance; Old Fair Green; plantation at north-east corner of Ballsbridge; plot at corner of Church lane, Donnybrook, opposite Rampart I. In the course of the discussion it was stated that the sites above-mentioned would permit the erection of 200 cottages at a cost of between £15,000 and £18,000.

**Rathdrum (Co. Dublin).**—The District Council have decided to appoint a clerk of works in connection with the forthcoming scheme under the Labourers' Acts.

**Waterford.**—We stated in error last week that Mr. Ryan was responsible for the designs of the new chapel schools of the Christian Brothers at Mount Zion, Waterford. Mr. J. P. Wren, 180 Great Brunswick-street, Dublin, was the architect, and Messrs. Hearne and Son were the contractors. The new chapel, designed by the same architect, was formerly opened on Saturday last—the Most Rev. Dr. Sheehan, Bishop of Waterford, presiding.

#### THE ROYAL SANITARY INSTITUTE. EXAMINATIONS IN SANITARY KNOWLEDGE

Examinations have been arranged in Sanitary Science as Applied to Buildings and Public Works, Hygiene in its Bearing on School Life, and for Inspectors of Nuisances (under the Public Health Act, 1875), in Dublin on April 12th and 13th, 1907, and for Inspectors of Meat and Other Foods in Belfast on April 19th and 20th, 1907.

Application forms and other particulars to be had from the Secretary, 72 Margaret Street, London, W.

#### THE SLOB LANDS AT CLONTARF.

Truly, it is a fact that great bodies move slowly! Of late we have heard a great deal of the beneficent efforts of the Corporation to deal with the filthy slob lands of Clontarf, and the trouble they have become involved in with the residents in the vicinity, who, apparently, object to being robbed of the healthful and agreeable odours of the slob-lands. Nevertheless, we are told that the progress of the work of reclamation will be prosecuted "without delay."

"Without delay!" at the close of this year of grace, 1906.

In our issue of November 1st, 1872, we published a report of a notice of motion in these terms:—

"The following notice of motion by Mr. Norwood was referred for consideration to Nos. 1 and 3, and the Main Drainage Committees:

"That in order to abate the unsightly nuisance at present existing on that portion of the slob land, forming part of the Corporate estate, and situate between the Dublin and Drogheda Railway, the East Road, Annesley Bridge, and the Clontarf Road, and to afford convenient place for deposit for the street scavenger, and enable Committee No. 1 to disuse the present objectionable scavenging depots in the city, Committee No. 3 be directed to inquire as to the steps necessary to be taken for the reclamation of such portions of said slob land, as are not included in the land authorised to be taken, under the provisions of the Dublin Main Drainage Acts, with the view of forming said land, or such portion thereof as may be deemed advisable, into a peoples' park, under the provisions of the several statutes authorising the formation of public parks, and that said Committee do report thereon without delay to this Council."

And writing under same heading as this paragraph our comment was as follows:—

"Without delay! How wonderfully smart our magnates grow when the 'October ales' are brewing. The people's park, we fear, has a long vista. Talk of reclaiming 'slob' land in a hurry. Why our present Corporation have converted, during their disastrous career, the better portion of our city into little short of one expanse of 'slob land.' It is the city land within the city that requires reclamation first and 'without delay.'"

#### CORRESPONDENCE.

##### Oak Panelling.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

Sir,—With reference to the note in this week's IRISH BUILDER—"E.C.D.—Oak Panelling," we would be very glad to make oak panelling much cheaper than the price mentioned. From 2s. 6d. per superficial foot, up, according to the requirements, and architraves from 2s. a foot. This might help your correspondent and enable him to get such work made.—Yours, etc., T. R. SCOTT AND CO.

[In mentioning the price given in our last issue in reply to "E.C.D." we were aware that oak panelling could be done for less, but our correspondent, in his communication to us described fairly elaborate work, and we took it, bought a rather better class of work than the ordinary run. However, we are much obliged to our present correspondents for their information.—ED., I.B. and E.]

#### The Royal Institute of the Architects of Ireland and the Local Government Board.

TO THE EDITOR OF THE IRISH BUILDER AND ENGINEER.

Dear Sir,—In your issue of December 1st, under the heading of "Comments," there is a statement with regard to the advice given by the Council of the Royal Institute of the Architects of Ireland to the Local Government Board as to architects' fees under the Labourers' (Ireland) Act, 1906, which statement is misleading.

The Council wrote as follows:—

"That payment under paragraph (c) be by a sliding scale, with a maximum of 5 per cent. and a minimum of 2½ per cent. depending on circumstances, with expenses in addition."

The Local Government Board have made the maximum fee 2½ per cent.—I am, sir, yours faithfully,

JAMES H. WEBB, Hon. Sec.

**Tempo (Fermanagh).**—Tenders are invited for the erection of a tower and spire to the Catholic Church, Tempo, Co. Fermanagh, for the Rev. P. S. O'Neill, P.P. Tenders to be delivered not later than 5th of January, 1907. Mr. J. V. Brennan, C.E., is the architect, Belfast Bank Chambers, Belfast.

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## THE ARCHITECTURAL ASSOCIATION.

## Ferro-Concrete.

The subject of the lecture at the fortnightly meeting of the Architectural Association of Ireland was "Reinforced Concrete Construction." Mr. Joseph Holloway, President, occupied the chair, and the lecturer was Mr. Frederick Batchelor, F.R.U.I., B.A. There was a large attendance of students and others.

The discovery of the principle of introducing iron or steel into concrete to resist tensional stress was, said Mr. Batchelor, of comparatively recent date. In the Paris Exhibition of 1855 there was an exhibit of this material, and by the year 1861 M. Francois Coignet, a French engineer, had designed various methods of its application. But to M. Morier, a French gardener, was attached the first practical employment of re-inforced concrete. He used it in the construction of ponds, tanks, and floors, and later on of small bridges. Other systems were subsequently brought out on the Continent and in the United States. It was, however, many years before this new principle of construction found favour in the eyes of the British engineer, but the advantages it possessed over every other kind of building materials for certain classes of work at length had it fully recognised. The results of its use had been carefully recorded, and these were found to be satisfactory. Mr. Batchelor discussed the materials that should be employed, and gave diagrammatic illustrations. Messrs. Hely's new building in Dame-lane was constructed entirely of ferro-concrete, which, the lecturer pointed out, could be adapted to all curved forms, such as gallery tiers in theatres, projecting bases, arched windows, and other similar portions where the employment of the usual building materials would be of complicated and costly construction. It could be economically employed in all public buildings which had to sustain heavy loads. Its fire-preventive and non-absorbent qualities made it particularly suitable for hospitals, work-houses, and hotels. Mr. Batchelor summed up the advantages of ferro-concrete as fire-resisting, impermeability, and durability. It had certain disadvantages—conveyance of sound to a disagreeable extent, its hardness and impenetrability, and also the danger of disturbing the equilibrium of a building when alterations were being carried out. In the construction of buildings of this material, therefore, more than ordinary foresight should be recognised, and provision made to avoid all possible contingencies.

ENGINEERING AND SCIENTIFIC ASSOCIATION  
ANNUAL CONCERT.

On Saturday, 15th December, the annual smoking concert in connection with the Engineering and Scientific Association of Ireland, was given in the Aberdeen Hall of the Gresham Hotel. Sir Charles Cameron presided over a large audience, and the concert proved to be an extremely enjoyable affair. The programme was an excellent and admirably diversified one, and provided most enjoyable entertainment. There was not only a plethora of talent, but the quality was above the average. Songs were rendered by Messrs. P. W. Harrison, W. H. Jones, W. A. Page, J. Holliday, H. Layng, C. Cameron, W. F. Cope, P. F. O'Sullivan, R. W. C. Wilson, A. W. Donaldson Studdert, P. C. Taylor, Britton, and J. J. Farrell; recitations and humorous songs by Messrs. J. L. Featherstone, W. H. Huish, E. H. Kearney, C. G. Mitchell, O'Callaghan, and Smith; and instrumental selections by Messrs. W. E. Harrison, violin; J. Carroll, violoncello; F. P. D'Arcy, piccolo. Mr. C. J. Joze's gramophone entertainment was not the least interesting item of the big programme, while Mr. W. F. Cooper did some clever conjuring tricks. The accompanists were Mr. G. F. Porter and Mr. Thomas W. Weaving. The arrangements were carried out by Mr. J. W. Boucher and J. G. Purcer, and they and the members of the Association are to be congratulated on the success of the entertainment. The proceedings concluded with the singing of "Auld Lang Syne" after a vote of thanks had been passed to the Chairman on the motion of Mr. James Oakes.

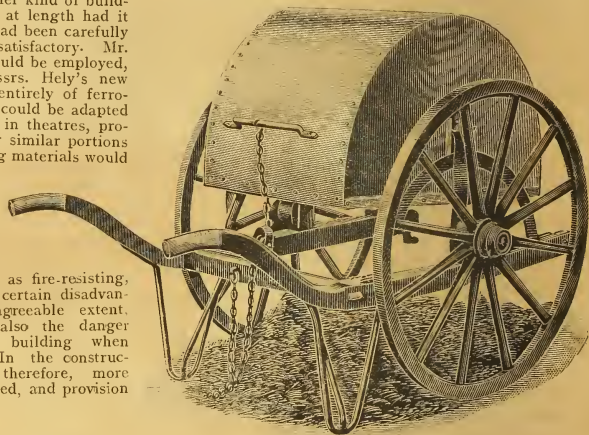
## ANSWERS TO CORRESPONDENTS.

## Printing Drawings.

"A.D." wants to dispose of double-elephant size printing frame and outfit cheap. If any reader wants such a frame we shall be glad to put our correspondents in touch.

## STREET ORDERLY HANDCART.

The illustration which we give herewith represents a Street Orderly Handcart, manufactured under Sawyer's patent by Messrs. George Ell and Co. (contractors to his Majesty's Government), Bridge Wharf, Bishop's Road, Paddington, London, W. These carts present many features of superiority to any with which we are acquainted, and should certainly supersede the cumbersome and insanitary barrows at present in use, the construction of which, combined with the material of which they are made, renders it impossible to effectually cleanse them. These patent carts are so designed as to overcome these difficulties. The buckets are made of Galvanised iron, and being circular in shape present no corners to act as pockets for road scrapings. They, therefore, readily clear themselves of their load when turned over, as shown in our illustration, and are easily cleansed. The receptacle is hung on trunnions supported centrally, so that the hands are relieved of all weight, and the cart, when fully loaded, can be pro-



The cart discharging its contents.

pelled by a boy. In addition to the provision for overturning the bucket, the latter can be lifted from the bearings, and the refuse shot into van, cart, or barge. The carts are provided with covers, sliding or folding, as preferred, preventing the escape of dust or effluvia in transit through the streets. Though intended for street-cleansing purposes, they are admirably adapted to many other uses, such as the conveyance of shingle for road repairing, blood, manure, water, laundry work, etc. These carts have been largely adopted in many boroughs and districts in England, amongst which the following may be named:—Paddington, (20 carts), Wandsworth, Woolwich, Ripon, Huddersfield. They are, in all cases, giving the utmost satisfaction, and we are confident that Irish Municipal bodies might, with advantage, adopt them. We understand that the makers would forward one on approval by arrangement. Messrs. Ell, in whom all patent rights are vested, are the sole makers, and orders and inquiries should be sent to them at the address given above.

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Photo by]

The Church of St. Seurin, Bordeaux.

[Maison Terprou, Bordeaux.











Photo by]

La Crosse Cloche, Bordeaux.

[Maison Terpercau, Bordeaux.

# ENGINEERING SECTION.

## ITEMS.

The 52nd annual general meeting of the Society of Engineers was held on December 10th, Mr. Maurice Wilson, President, being in the chair. Mr. Richard St. George Moore was elected President for 1907, and Mr. J. H. Wilson, W. H. Holtham, and G. A. Goodwin, Vice-Presidents. The President's gold medal was awarded to Mr. Frank Latham.

\* \* \* \*

The Russian Government have employed an American engineer, Mr. Jackson, to perform the initial surveys for a proposed canal to join the Baltic and the Black Sea, at a cost of 200,000 roubles. It is conditional that Russian engineers shall, as far as possible, be employed on the staff, and, if the scheme falls through, Mr. Jackson will be recompensed for his work, but not in excess of the amount of the estimated cost.

\* \* \* \*

Exhaust ventilation, for the removal of injurious dust and fumes, is expressly required by regulations and special rules in many trades, and under section 74 of the Factory and Workshop Act, inspectors are empowered to require such ventilation wherever any work is carried on by which gas, dust, vapour or other impurity is generated. To properly effect the desired result, it is obvious that an exhaust installation should be designed in such fashion as to remove the impurity as near as possible to the point of origin, before it can disseminate itself throughout the workshop. The regulations have effected a great advance during recent years, by which the conditions under which employees work have been mitigated, but effective ventilation is often so difficult a problem to solve, and so many ineffective installations have been provided at a considerable cost, that it has been decided to collect and publish, for the guidance of manufacturers and their engineers, a number of examples of well-designed schemes. Such examples have now been issued in book form, and can be obtained in London, Edinburgh, and Dublin, in the latter city from E. Ponsonby, 116 Grafton Street. As the collection was supervised by Commander Sir N. P. Freer, R.N., late superintending inspector for dangerous trades, the information contained will, undoubtedly, prove most useful to those for whom it is intended.

\* \* \* \*

Mr. Frederick Batchelor, F.R.I.B.A., is to be congratulated upon the concise and lucid lecture he gave to the members of the Architectural Association of Ireland, on December 11th, the subject being, "Reinforced Concrete Construction." It is only of quite recent years that this new method of building has been properly considered in the United Kingdom, and, although greatly used on the Continent and in the United States towards the end of last century, it has hitherto been regarded by the engineering and architectural professions in these islands as a "Yankee innovation," a phrase which occasionally carries with it its own condemnation. But lately reinforced concrete, ferro-concrete, armoured concrete, call it what one will, has been suddenly raised to a giddy pinnacle of professional favour, and the session of any technical society is as certain to include an address on the subject as a modern musical comedy is to contain a coon song. Undoubtedly the amazing spread of the ferro-concrete cult is due to the wonderful results that have been obtained by engineers in its use, which are certainly unobtainable with the older methods. Together with these results there is a great insistence, on the part of the patentees, manufacturers and contractors, who are interested in reinforced concrete, which is making itself felt amongst the professions to a wide extent, and this is probably due to the fact that there are over fifty different systems on the market, a statement which doubtless astonished many amongst Mr. Batchelor's audience. The system treated chiefly by the lecturer was

that known as the "Hennebique," of which he has had considerable experience, but other systems and their advantages were impartially dealt with. It is not often, at the present stage of evolution, that one hears of the disadvantages of reinforced concrete, but Mr. Batchelor mentioned three, to which we would call our readers' attention, viz., the necessity of having the materials mixed and placed in position with the utmost care, the difficulty of avoiding transmission of sound from floor to floor, and building to building, owing to the divisions being thin, and excellent sound conductors, and most important of all, that, the buildings being homogeneous, alterations are practically impossible and possibly dangerous. Such grave disadvantages, whilst applying only slightly to engineering works, are quite sufficient to condemn the material for domestic architecture, unless such precautions are taken as will increase the cost beyond that of ordinary building. But, in addition to these structural disadvantages, there is one that was pointed out by Mr. Allberry in supporting the vote of thanks. Reinforced concrete is, to a great extent, in the hands of patentees, who license certain contractors to carry out the works. Practically no data are yet obtainable, by which an architect, in ordinary practice, can design his building without calling in the assistance of experts. Its use, under present conditions, will, therefore, tend to abrogate the functions of the architect or engineer, and transfer his responsibility to the contractor, a most undesirable state of affairs from a professional point of view. While we may therefore welcome a new method of construction, which combines the essential elements of strength, economy and ability to resist the ravages of fire, we can only reiterate a hope, often expressed in our columns, that a commission of reliable architects and engineers will independently examine into and report on its merits. The result of such expert analysis should present the interested professions with sufficient data, first to be able to judge for themselves, without the aid of interested advisers, whether reinforced concrete is suitable and economical for employment in a certain work, and then to design and detail their structures, and call for tenders in the manner which is the common practice when other materials are employed.

\* \* \* \*

It was interesting to learn from Mr. H. J. Pentland, R.H.A., who proposed the vote of thanks at Mr. Batchelor's lecture, that he has recently designed an extensive addition to the offices of the Land Commission in Merriem Street, on the Kahn system of reinforced concrete, the floors of which will be constructed of Kahn beams and concrete, strengthened with expanded metal. We understand that the materials alone are supplied under this system, which is a long step in the right direction, leaving it open for contractors to tender for the actual erection. It appears that there is a saving of nearly 25 per cent. on the estimate based on the usual brick, steel, and concrete floor construction.

\* \* \* \*

The City Engineer of Cork, Mr. F. Delaney, M.R.I.A.E., who was well known in Dublin prior to his appointment, appears to be making a good name for himself in the southern capital through economical construction. Under his management the Public Works Committee found themselves suddenly confronted with a sum of £600 unexpended, in connection with improvements at Penrose Quay. Those of us who are accustomed to look on gigantic extras as a necessary sequence to our municipal undertakings, can well imagine the consternation caused amongst the Cork city fathers when faced by such a considerable saving. Like Medas of ancient fable, the wealth proved more of a nuisance than otherwise, and a difficulty arose as to its disposal. Indeed, so intricate was the unique problem that the Law Agent was called in to report. None could better offer an opinion as to the disposal of superfluous cash than a member of the legal profession, and we may confidently expect



an early solution of the crisis. But Mr. Delaney is to be heartily congratulated on the results of his management, especially if it stimulates other municipal engineers to emulate his method of giving their employers a Christmas box.

\* \* \* \* \*

It will be recollected that last year a Local Government Board enquiry was held in Cork with reference to the staff at the Waterworks, several occurrences having taken place indicative of lax discipline. As one of the results of the enquiry a labourer was dismissed by a resolution of the Council, a subsequent motion being passed recommending him to the favourable notice of the City Engineer if an opportunity for his re-employment arose. Such a weak method of dealing with the case has had a natural sequence. The labourer has dogged the steps of the engineer—pestering him, threatening him, and eventually assaulting him, because the latter had not reinstated him in the service of the Corporation. At the prosecution, before the magistrate, a continuance of weak policy was exhibited, with the obvious intention of mitigating the sentence on the defendant. The City Engineer, in a generous spirit, asked that no term of imprisonment should be imposed, and two members of the Corporation appeared to plead for leniency. The magistrates fortunately recognised the extreme seriousness of the case, and sentenced the man to a month's imprisonment with hard labour, further binding him over, himself and two sureties to keep the peace for twelve months, or in default to serve a further term of two months' imprisonment. Never was there a clearer exposition of the folly of undue clemency on the part of a public body. Here was a labourer found, after a lengthy enquiry, to be of such a character that his services could no longer be retained. Yet scarcely is he dismissed, than it is suggested he should be reinstated. What authority would his superiors have over him had this course been adopted? Surely in these unfortunate days, with so many unemployed in our midst, it is unnecessary to condone unsatisfactory service. Had no subsequent motion been passed, this man would have probably sought and obtained other employment, instead of waiting idly on the steps of the City Hall for another job, and the City Engineer would have escaped a black eye. But with an absurd fear of appearing harsh, when severity was essential, the Corporation overlooked the necessity for discipline, and the need for protection of their own official, and the result of their indecision is evidenced, as is usual where issues are not clearly defined, by detriment to themselves, their engineer, and especially to the object of their misplaced pity. It is satisfactory, however, to find that the long intimidation to which the engineer must have been subjected, probably backed by outside influence, did not result in the reinstatement of the labourer, and Mr. Delaney's fellow engineers throughout Ireland will congratulate him on the decided stand he has taken against a well-recognised form of impotency, and condole with him on the temporary inconvenience to which he has been subjected.

We are pleased to see that Messrs. W. F. Clokey and Co., of Belfast, are having a fair share of business in the North. Although the building trade is not extremely brisk, this firm have orders on hand for about 50,000 feet of glass, and at the moment they have over 1,000 sashes on hands in their warehouse for glazing with leaded lights, plate and sheet glass. And yet this is only one branch of their business. The other branch is the paint department, and it is an admitted fact that they are well known to every recognised decorator over the North. At the present they are introducing a comparatively new paint which is known as "B.P." This is a ready mixed paint, composed of the very finest materials and ground by the latest machinery. It is put up in one gallon tins of very choice colours, so that the decorator can have almost any shade ready for use at a moment's notice.

We fail to see how a practical painter would think of mixing his colours when he can have Berger's paint without this trouble and at slightly less cost. Certainly W. F. Clokey and Company have made Berger's name a household word with the decorator up North, and it is an acknowledged fact that their name is a standard of quality for fine class colours. We have received a shade card which, we understand, will be sent to anyone on application.

#### USEFUL INFORMATION PERTAINING TO THE USE OF STEEL.\*

We have lately received from Messrs. Dorman, Long and Company, of Middlesburgh, a most useful and attractively got-up pocket companion, bound in limp red cloth, containing many tables and other data relating to the use of steel.

The use of steel is now so general, and the formulae adopted so well understood, that it is hardly necessary to emphasise the utility of a book brought out on the lines indicated by the title. This little work will be found of enormous convenience by those engaged in the design of steel construction, and effecting much saving of time in the working out of formulae.

A full account of the various descriptions and sections rolled is given, the firm's stock comprising rolled sections of every foot from 10 to 40 feet lengths; and the exact detail in which the tables are given enables the exact section and weight required to be determined almost at a glance. No other work we have come across contains anything like the same wealth of information, which inevitably tends to economy of construction. The application of steel to various classes of structures is also dealt with, such, for instance, as bridge work and roof trusses, deck trussing, beam grillage, as well as an enormous variety of rolled sections in beams and stanchions. Types of joints and connections are plentifully illustrated. In addition to the foregoing, the second portion of the book is devoted to formulae, tables, etc., comprising mensuration, trigonometrical functions, strains and stresses, weights, tables of squares, cubes, square and cube roots, etc., weights and measures. In a word, once employed, this little book will ever after be an indispensable desk companion.

The firm of Dorman, Long and Company, is so well known throughout the world, that it is hardly necessary for them to press the excellence of their products, and some idea of the vast extent of their business may be gained from the illustrations shown of their enormous works.

Some people, particular enough about other details, strange as it may seem, think it immaterial where their steel comes from or who rolls the sections. A second's reflection will show that this is not right. In the first place, if you are looking up the proper section to use, having your weights to be carried, etc., before you, if you have a catalogue giving so enormous a variety of sections, you are bound to get a section almost exactly what you want. If you have a bit less of variety, you probably chose a needlessly heavy section, and, in ordinary work, one cannot work out the formulae, and then design the exact section to be rolled; life is not long enough, and besides it might end in special sections having to be rolled. Next, in ordering British steel from a firm like Messrs. Dorman, Long and Company, you know that you will get a uniform and reliable product, capable of bearing the stresses promised, and shown by results under test, and if you are working neatly this is important, and not always to be had with some of the cheap, foreign steels imported; made by, no one knows who.

Every engineer and architect should possess this admirable section book.

\* Pocket Companion, containing useful information and tables relating to the use of steel manufactured by Dorman, Long and Co., Ltd., Middlesburgh, England, for the use of engineers, architects, and builders, 1906.

**Galway.**—The filling of the vacancy to our County Surveyorship naturally has become an interesting question, and there is much speculation as to who Mr. Perry's successor is likely to be. The office carries a splendid salary. A number of gentlemen are mentioned as probable candidates, and amongst them is our townsman, Mr. Robert J. Kirwan, C.E., at present attached to the staff of the Congested Districts Board, Claremorris. Mr. Kirwan, it will be remembered, was a candidate for the Co. Surveyorship of Sligo last week, and was only defeated by the chairman's casting vote. Mr. Kirwan is eldest son of Mr. Henry Kirwan, J.P., an old and respected member of the Tuam District Council. He is eminently qualified for the position, and is certain to receive a very large measure of support. Mr. M. J. Tighe, C.E., Inspector of the Board of Works at Galway, is also a popular favourite.—"Tus. Herald."

The election will take place at the first meeting of the County Council in February.

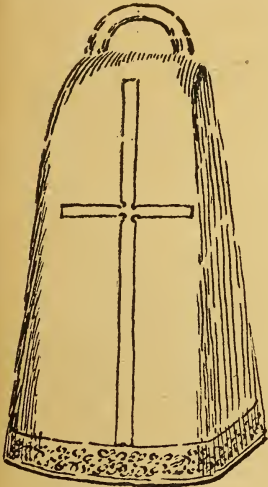
**BANGOR, CO. DOWN.**

By W. J. FENNELL, F.R.S.A.I., F.R.I.B.A.

The writer has been frequently asked for information regarding the history of this now favourite watering-place, not by its inhabitants, with whom, of course, it is, as if should be, vastly familiar; but by the stranger who visits our shores, and who has learned something of it, even in

out-of-the-way places in Italy. This often-expressed desire for information has led to the turning over of many books and the gathering together of the following notes which may be of interest to some readers, as well as to the visitor who, like many a bygone worthy, seeks for the site of the cloisters of the once famous monastic college of our local Bangor.

Its earliest name was Inver-Beg (the river mouth), which later on changed to "the Vale of the Angles," derived from its name Bean Choir, modernised into Bangor, signifying the "White Church," or "Fair Church."

**Bangor Bell.**

The first authentic record states that about 555 A.D. St. Comgall founded an abbey of regular canons at Bangor. Comgall was born at Magheramorne, in Antrim, and studied at Colnegagh, in Queen's County, from whence he came to found a great seat of learning at Bangor, and lived to reach the venerable age of ninety years; but his college flourished for eight hundred years after him, and, as a small tribute to his memory, his name may be seen engraved over one of the modern church doors at Bangor. So great was the reputation of Bangor University that Alfred the Great, Saxon King of England, sent to it to supply professors to Oxford when he founded or restored that University.

Amongst the long roll of names connected with Bangor, and which now and then float into the light of these latter busy days, when an inquiring mind glances back over the long intervening centuries, are those of St. Carthagus, who succeeded the founder, and Launus, who founded over one hundred religious establishments. It must be remembered that these great centres of early piety were also the seats of all learning, progress, and "Technical Instruction"; and, if we lose sight of this important factor, we may then regard the names of these men as mysterious sounds conveying no thought or meaning. We also read of St. Carthach, who founded a great college at Lismore, and St. Fintan of Doon.

It is interesting to learn that Bangor's Abbey offered a shelter, an asylum for those weary with the cares of State, and that Cormac, King of Hy Bairrche in Leinster, retired to it to end his days. The histories of other nations give similar illustrations of heads, weary with their crowns, retiring to the seclusion and peace of the cloister, leaving outside "the polished perturbation, golden care" to encircle the brows of younger and more impulsive heads.

Bangor did not shut its doors to solitary devotion. The early monks were not built that way, nor selected for that purpose. Its great men, and there were many, have been called "the morning stars of Christian life." Bangor trained them, but did not keep them. The eyes of that active Alma Mater looked over Europe, and out into its utmost limits she sent her willing sons, whose souls "were lighted with wisdom from on high;" and, after their life

work was done, the coveted distinction of the Church was bestowed on many of them; but among all the Bangor scholars the brightest halo shines around the head of Colambanus.

We do not believe much in the practice of setting up statues, unless to exceptional merit, but we think a town that produced two such men as Comgall and Colambanus would honour itself by erecting such memorials to two such men as these.

From Bangor University, which had become famous twenty years after its establishment, set out in 575 a band of devoted men as missionaries to Gaul, led by Colambanus, one of the greatest pioneers of whom the early Church can boast. That sixth century teemed with great Irishmen.

From Movilla, near Bangor, founded by Finnian, went out Columbkille, who founded Iona, by whom was sent the mission to North Britain; and Lucca, in the hour of her famine, called Finnian to her, and, obeying the Pontiff, he hastened to the pestilent town like Damien to the lepers.

Even the lonely Aranmore sent out Fursey, who founded the Abbey of Lagny, on the Marne. But from Bangor went out Colambanus, and with him the following Irishmen, who, in their turn, were duly canonised. Amongst them were:—St. Atalas, who succeeded him at Bobbio; Saints Dagmal, Eogain, and Eunan—known in Italy as Dominzale, Eugano, and Eunoco; Saint Gall, who founded the famous monastery of St. Gall, on the shore of Lake Constance, and whose name is borne by one of the cantons of Switzerland and by a hospital in Rome; Lua, founder of a monastery in Neustria; Sigibert, who founded the monastery of Disentis in the Grison country; Waldolen, provost of the Monastery of Luxeuil, and who, with St. Walderic, propagated the faith amongst the pagans of Neustria (M. O'Riordan, D.D., D.C.L.).

Bangor of to-day may regard with pride such a list of scholars—"Irishmen, inhabitants of the furthestmost parts of the world," as Colambanus called them when writing to Pope Boniface IV. in 612.

We have no space now to recapitulate the history of this man and his extraordinary determination and ceaseless energy, nor his labours in Gaul and Lombardy. We take it that everyone in Bangor knows all about their great townsman, but if the tourist of to-day desires to know how venerated and cherished is the memory of that Irishman, let him pause in his race to the sites of modern Rome and visit the village of San Columbano, near Piacenza, where he will see much to interest him, and will learn how strongly and how deeply the Bobbissi love their Santo, and how his work amongst them is a thing never to be forgotten. His is the memory of a hero.

In 818 a cruel massacre occurred at Bangor by the Danes, who killed the Abbot and 900 monks. As this does not represent the whole college, it may be imagined how extensive it must have been. At one time the number of students on its roll almost equalled the present population of Bangor. Like many other parts of Ireland it had to fight fearful battles for its existence against sea robbers as well as land robbers. The wealth and possessions that gathered round these mediæval institutions made them most attractive places well worth plundering, and Bangor was no exception. Her possessions even extended to the Isle of Man, over portions of which her Abbot ruled subject to homage to its king.

As a seat of learning—a deservedly illustrious university—Bangor ceased when the Norman invasion began. Then the Early Church, and all its famous schools and all its methods, became absorbed into the power of the ecclesiastical forms practised by the Norman monks, and the distinctive features of Ireland's teaching—its arts and culture, became things that illumine a great past.

The final blow to any little Irish character that may have remained came in 1367, when it was enacted that no mere Irishman should be allowed "to make his profession in a religious house situated amongst the English." This enactment extended to the Abbey of Bangor, and after that the race to which Colambanus and Gall belonged "were excluded from the cloisters they had sanctified."

In 1125 we find that Malachy, another noted Irishman, and Bishop of Down and Connor, resided here until he was



called to the Primate's chair in Armagh. Malachy rebuilt the church, which flourished for the next three hundred years, but in 1469 it had become neglected by the regular canons, and Pope Paul II. transferred it and its possessions to the Franciscans, and from them to the Augustinians, with whom it remained until the dissolution. By this time the people of Bangor were poor and needy, and the Franciscans were ever the pastors and friends of the poor.

James I. granted the Abbey to Sir James Hamilton, from whom may be traced the families of Bangor, Dufferin, Killleigh, Ward, etc., whose representatives at the present day retain their connection with the County Down and some with historic Bangor.

In 1689 the Duke of Schomberg, having landed at Groomsport with the advanced portion of William III.'s army, marched to Bangor, and Sir Patrick Dunn, a doctor whose name is still remembered in Dublin, and who was evidently in the service of Schomberg, wrote to James Hamilton, of Bangor:—

"Chester, tuesday, 20th August, 1689.

"DEAR SIR,—Seaventy sail of the ships that went out with the Duke of Schomberg's army returned last night, Munday, they bring the news that the Duk Schomberg landed all his men on tuesday was seven night before sun sett at Bangor. . . . his Grace lodged last night in your house at Bangor."—(Ulster Journal of Archaeology.)

The tangible relics of that early exalted age existing now are few indeed. "There is scarcely anything of the monastery but the shadow of a great name," and a few feet of its church wall dating from the thirteenth century, forming part of the boundary wall of the garden of the rector's house, which is sometimes visited by—an American.

The seal of one of its Abbots is preserved by the Royal Irish Academy. It was a great thing to become an Abbot in those days, and family pride suggested the incorporation of its heraldry into the seal, which caused each succeeding Abbot to have one of his own. The seal in question dates from the fourteenth century and is inscribed:—

"S. R. Pris. Johannis. Kenedy. Abis. de. Bangor,"

and contains a figure of an abbot in a niche surrounded with Gothic work, suggesting even later work than fourteenth century, and underneath this work is the arms of the Kennedy family. Abbot Kenedy was in power in 1395, when the perpendicular style was fast approaching. The Belfast, Holywood, and Bangor Railway, before it was absorbed into the County Down Railway, adopted this relic as their corporate seal.

Bangor has left some priceless relics in the shape of books, scattered in the great libraries of Europe. The Antiphonary Benchorensis, or Antiphonary of Bangor, a book of anthems written in the seventh century for services in the college church at Bangor, is now in the Ambrosian Library at Milan. "It was presented, with other Irish books, by Dungall, an Irish scholar of the ninth century, and one of the founders of the University of Pavia, and possibly a graduate of Bangor, whose death is recorded in 834. This book remained at Bobbio till 1666, when it was removed by Cardinal Frederick Borromeo to the newly-founded library in the capital of Lombardy, where it can still be seen."

Amongst the treasures in the library of St. John's College, at Cambridge, the writer was shown a Psalter, commonly known as the Southampton Psalter, because it was given to the library by Thomas Earl of Southampton, but it is strongly conjectured to have belonged to Bangor, in Ireland, and has attracted much attention from Celtic scholars, by whom it is attributed to the ninth century. It will be interesting to observe if any light can be thrown on it in the revision of the catalogue of the St. John's College MSS., which has recently been undertaken by Dr. James, the present Provost of King's College.

The high cross of Bangor once stood in the Market Square. No Irish town, much less one of the importance of Bangor, would have been perfect without one. A fragment of the old shaft, worked with a panel of our national ornament, is still preserved in Lord Dufferin's chapel at Clandeboye.

The bell of Bangor is in possession of the M'Cances of Holywood, County of Down, and is made of bronze, and of

the type of Irish bells belonging to the tenth century. On the face of the bell is inscribed a cross, and round the base an Irish ornament runs.

The present old Parish Church contains the only relic of the Anglo-Norman work in Bangor, being a mutilated portion of a uniform stone, or burial slab, and from the shears or scissors carved on it as the emblem of womanhood we know that it was intended to mark the resting-place of a lady of high rank. Such stones are numerous in the County of Down.

These scattered fragments, battered and time-worn, which, if collected together, would hardly fill a room in a modern Bangor villa, are all that remain of an extinct university to which Christendom owes so much. Other relics may yet come to light, and when they do we hope they will not be hidden in private collections, nor fall into the hands of commercial antiquaries, but that a true spirit of patriotism will preserve them for the free use of the student and for all comers in our own national Museum, or in some other local kindred centre, where access to them can be had equal at least to the welcome freedom that surrounded them from the sixth to the twelfth century.

In passing, we might mention that the old building near the pier at Bangor was once the Custom House, but it does not appear to have been a castle, as one might suppose at first glance. It may also be of interest to note that at Rath Gacl, in Bangor, the first Sunday school in Ireland was formed.

With these hastily thrown together notes we conclude, trusting that the future of Bangor, in Down, may be splendid as its past. But before we lay down our pen we cannot refrain from quoting from our old friend, who endeared himself to all classes, the late Very Rev. Monsignor O'Laverty:—"In the beginning of this (19th) century, in company with the late Dr. O'Donnell, of Belfast, there visited the Protestant Church of Bangor an aged ecclesiastic, whose whitened locks and venerable mien threw around his person an air of interest that betokened to the most unobservant that no casual visitor was he. As he approached the communion table, near where once had been the altar, a gleam of sunshine of youth seemed to light up the features of the old man, and his prayers, which at first were in silence, suddenly, through ecstatic forgetfulness, were raised to a degree of audibility that embarrassed his companion, while it still more astonished the sexton. The old man was the Lord Abbot M'Cormick—the last Abbot of Bangor."

#### PHENOZONE SOAP.

This not being what is usually understood as a household journal, discussions as to the virtues of soap seem hardly appropriate in our pages, albeit that builders' architects and others of our *clientele* are, no doubt, confirmed users of that article both in their business and private capacities. Phenozone is not, however, a toilet soap, though we understand that a little of it in a bath is both refreshing and invigorating to the bather. It is a cleanser which will be found of great value by those whose lot it is to have to do with building and cognate trades. For example, it is claimed for Phenozone soap that it far excels soft soap in cleaning mosaic and tessellated pavements, marble floors, etc., particularly where there is oil and grease dropped, as, for example, in engine rooms. It has the property of thoroughly dissolving and neutralising oily substances and so makes such floors look as bright as when first laid. The same property makes Phenozone most efficient for painters and decorators for cleaning down old work, etc., as it leaves the surface quite free from any greasy feeling. It is also an excellent cleanser of painted work, removing stains and disfigurements with rapidity. We may mention that we have had it tested in this last respect and found the soap fulfil all that is claimed for it. Phenozone we have also found an ideal cleanser for floor cloths, which it has a knack of brightening and rendering glossy.

We understand that it possesses marked hygienic properties, and that on this account it is a decided boon not only for household purposes, but also for use in hospitals and institutions. Samples and full particulars will be sent on application to the Phenozone Soap Co., Wandsworth, London, E.C.

## THE INDUSTRIAL RESOURCES OF IRELAND.

By T. E. HUDMAN.

(Special to the "Irish Builder and Engineer.")

## II.—TIMBER.

"That the country was some centuries ago remarkable for its extent of forests, as it is now by the reverse, appears from all our histories. Many causes conspired for their destruction. In some districts they were extirpated to increase the arable surface; in others, in order to destroy the shelter which bands of outlaws found in their recesses. An extensive export trade in oak was at one time carried on, and two centuries ago the manufacture of iron was in great activity throughout this country, and led to the cutting down, as Boate says, of innumerable trees in order to prepare charcoal. During all this time no one planted; all sought their immediate profit, and cared not for the future, and the final result has been that at present the timber grown in Ireland is not sufficient for those uses to which it is specially adapted, and as a fuel we may consider it never to be employed." The foregoing is an extract taken from Kane's "Industrial Resources," and its essential truth is equally applicable to-day as when Kane wrote it.

The timber is steadily being extirpated for the immediate profit, and no one re-plants. Any observant person on the quay-sides of our seaports must notice cargoes of round timber, all good, sound, useful trees, going away out of the country, and doubtless coming back again in the shape of furniture, carts, vans, etc.; and if one pursues the subject so far as to inquire the price paid to the grower of the timber, he will find that a few shillings a tree is all he was paid. If he should also be a user of timber, and require a similar class of wood, he will find it almost impossible to procure the native article of suitable quality except at prohibitive prices, and has to seek foreign wood for his purpose, as very little native timber is cut and converted for home use. So far as the round timber merchants of this country are concerned, they cannot be blamed very much for this state of things, as they cater for the demand made upon them; but it does seem as if we were "selling off regardless of cost," so that in a few years we shall be out of the business altogether. Now, this is a more serious matter than may at first sight appear, as we cannot shut our eyes to the fact that we are slowly, but surely, approaching a timber famine in all spruce, fir, and soft timber, owing to the difficulty, yearly increasing, of getting a sufficient supply of sound timber of good quality from abroad; in fact, as far as large timber is concerned, the famine has already commenced. The reasons for this falling-off in the quality of the foreign supplies it is not necessary to enter upon here; it is merely alluded to as a warning not to be lightly put aside, since it seriously affects one of the most important trades of the country—viz., the building trade—and, moreover, in addition to the tendency to shortage, there is an upward movement in price, the natural result will be a falling-off in that trade, which is always, even in the best of times, an expensive one, and as this is one of the oldest trades, also one of the most necessary, and one of the largest employers of skilled and unskilled labour, anything which tends to diminish it deserves a front rank position as a question of national importance. Taking this view of the matter, it is needless to point out that the re-planting of trees only to supply the waste now going on is not enough. We want sufficient to supply, if not all our wants, at least enough to so supplement the foreign goods, that we can be more or less independent and be in a position to buy only the best of the foreign goods.

This is a large subject, and many people have it in their minds. We have forestry societies, and enthusiastic lovers of trees who desire the re-planting of them, and we all wish them success; but this matter of tree-planting is a peculiar one. If it is to be done for artistic purposes, to render the country more beautiful in appearance, then it is purely a sentimental duty, and should rightly remain in private hands; but if we look at it as a serious business to be entered upon for national profit, it will be seen, if we give

it much thought, that it is beyond the province of private enterprise.

The time that must elapse before any profitable return is made to compensate for outlay and labour, makes it, beyond doubt, a matter for State management and control. To assert this, of course, brings us at once on to controversial ground, since the State, unless forced, is no more willing than are private individuals to work for posterity. But the knowledge of this well-known trait in human nature does not deter me from advocating this State control. There has been a considerable tendency of recent years to legislate on lines that are more beneficial for to-morrow than to day, and in this tendency I have comfort.

My belief is that, if reforestation is taken in hand properly, there is enough waste land in the country which, if planted now with suitable trees, would supply all our ordinary needs when the time comes. This alone would be a sufficient reason for doing it; but the continuous employment it would give to many thousands of men ought to make an overwhelming case in its favour.

Doubtless, the financial expert will put his foot down and exclaim against the cost, declare it impossible, and that the scheme is too big and visionary for an already overburdened Exchequer; but, at the risk of exposing myself to the charge of advocating silly finance, I will suggest a way by which I think it can be done. There are in this country about 4,000,000 acres of land that is practically unproductive. Some of it is bog, some is at an elevation of over 1,500 feet, and some is exposed to gales from the Atlantic seaboard to such an extent as to render it impossible for tree culture; but eliminating these areas, there are somewhere about 3,000,000 acres that could be profitably planted with trees. This land is now practically unproductive, and of little use to the owner for rent-producing, or to the State for taxes. Some of it is of no value, and the best cannot be worth very much. Its price could easily be fixed. It should be compulsorily acquired by the State; and as to its payment, we have the methods adopted in the various Land Acts as a guide; but I would not, for my part, hesitate to pay for it by a deferred system of Land notes of, say, £20, which should have a statutory legal currency in Ireland only, and be subject to gradual redemption from the earning power of the forests. Some method of this kind would obviate the necessity for immediate taxation, and would, moreover, keep this money value circulating in the country, which should be beneficial. Payment might also be made by redeemable bonds bearing interest equal to the present rent of the land, the redemption being postponed until the forests earned their own redemption.

Much of the land, while awaiting the planting of trees, could be made to earn its keep as grazing land. To carry out the reforestation, it would be necessary to establish a thoroughly efficient School of Forestry, having complete control of the land and the planting and cutting of the timber. The establishment of this department would, of course, mean a large annual outlay, to meet which it would be necessary to impose a tax, and against which, I have no doubt, there would be an outcry; but, in view of the fact that the establishment of these State forests would give permanent employment to thousands of men, who at present find it almost impossible to eke out a precarious livelihood in the country, and who crowd into and congest our towns, adding to the number of unemployed, resulting in an ever-increasing poor rate upon the taxpayer, the probability is that the scheme suggested would tend to the lessening of this rate to an extent that would balance the increase which such an establishment would demand. Of course, it will be said that there would be no return for this outlay for some years; that is, doubtless, true; but the creation of a large industry of such a healthy, invigorating character would be a national asset of no mean order, and should go



a long way towards stemming the tide of emigration, and be well worth the outlay. And if it was established on the basis suggested, we should, at the end of 20 years, have not only a prosperous timber trade, but many other subsidiary industries established by reason of it, that would give us that share of industrious prosperity so ardently desired by all well-wishers of Ireland. That it is well worth while for the State to take in hands its timber is shown by France and Germany, and also by England's Indian forests, and a careful study of their methods should prevent many initial mistakes. There are many benefits, other than the using of our own timber, which would be of advantage to the country, such as the beneficial climatic changes that would take place, and the prevention of flooding to the lowlands, and increased shelter to crops from storms, and many others.

As to the trees which should be planted, I leave that to experts, but I have mentioned the difficulty in getting home-grown timber for general constructional use. It is true that some of it is used at home—there are several prosperous industries established in various parts of the country, chiefly engaged in making furniture, and using native timber, but they are not as numerous as they might be. But in constructional work there is no disposition to use the home wood; this is partly due to the difficulty in procuring it of good quality, in the right sizes, reasonable in price, and well seasoned. Also, there is a general belief that it is more wasteful and more difficult to work than the foreign soft woods.

As before mentioned, the trade is not catered for, and that accounts for much of the disuse. As to the technical difficulty regarding the labour in working, I have knowledge of two recent contracts in Dublin where a considerable quantity of the joinery work was executed from home-grown lime trees, and the labour was very little in excess of what it would have been in ordinary deal, and this was compensated for in the price of the timber, which worked out less than foreign deals. The difficulty as to seasoning could be got over by artificial drying, and if merchants could be induced to try and convert such of the native timber as would be useful, into sizes to which custom has habituated us, I think they would find it more profitable than exporting it, as they at present do, and we would find that many of our woods have a more ornamental and artistic value than most of the foreign deals; and as material considerably influences design, there is, from an architectural point of view, a strong reason for the encouragement of the use of Irish timber in our buildings. Lime is not at all a bad substitute in colour for yellow pine, and for hardness and durability far exceeds it; used for mouldings, it gives that delightful sharp arris that belongs to hard woods, without the same difficulty in labour.

Chestnut is another of our woods that might be more often used. The white kind is a particularly fine timber, and well suited for hard-wood joinery of an ornamental kind. White poplar, which is not much grown here, is also a useful timber, clean to work, and some of it has a fine figure. Of oak, elm, ash, and beech I need not speak. But it must always be remembered, in dealing with home timber, that the trees are not cut or prepared with a view to their being used for joiners' work, so that, except from the few experiments that have been tried, we have no commercial basis upon which to work; but the scant information available is quite sufficient to make me believe that, properly organised, the present stock of home-grown timber could be more largely used at home than it is at present.

(To be continued.)

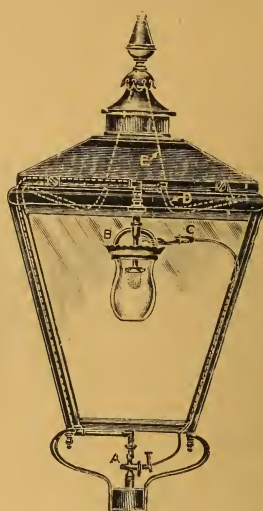
#### THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.

The annual dinner will be held this year in the Metropole Hotel (hour 6.30 for 7 o'clock), on Thursday, the 3rd of January, 1907. Dinner tickets 10s. 6d. each. Members may invite friends.

The date of the annual dinner has been fixed in order that Messrs. Cross and Hubbard, who have promised to read a paper on "Registration" before the Institute on that afternoon, may be present on that occasion.

#### THE STAR INVERTED BURNER.

This burner, of which we give an illustration as fitted to a street lamp, has recently come into great prominence, owing to its having been selected for street lighting purposes in the city of Edinburgh. For a good many years now, the public lighting of Edinburgh has been of a



somewhat mixed character, having been supplied by electric arc lamps, incandescent gas lamps, and flat-flame gas lamps, the last-mentioned predominating. These flat-flame gas lamps had only a consumption of two cubic feet of gas per hour, and, despite the high quality of the Edinburgh gas supply, have not been particularly remarkable for their illuminative power, so that the Scottish capital had not any great reason to be proud of its public lighting. During the past two years there has been a good deal of discussion in the Town Council and elsewhere, as to how the lighting of the city could be improved, and, with characteristic Scottish economy, the question of cost has, during these discussions, been kept in the foreground. It will

readily be understood that the municipal authorities, having been so long accustomed to a lighting bill based on lamps consuming two cubic feet of gas per hour, could not be brought to face any material increase upon this rate of consumption. They, therefore, deputed their lighting inspector and a noted gas engineer to go fully into the matter, and these gentlemen, after considerable study, experiment, and enquiry, decided that the existing flat-flame burners—some 10,000 in number—should be replaced by inverted incandescent gas burners. Having satisfied themselves that the inverted burner was the best for their purpose, the Edinburgh authorities had next to decide on the particular burner of this type, and they have eventually adopted the Star burner as being the "most effective one available."

The burner selected is that known as the Star No. 2, having a consumption of gas under ordinary circumstances of  $2\frac{1}{2}$  cubic feet per hour only; the Lighting Committee did not care to sanction the extra half-a-foot, and the Star Company are, therefore, providing a No. 2 burner, fitted with a carefully-drilled nipple, designed to average out at a consumption of about  $2\frac{1}{4}$  cubic feet per hour of Edinburgh gas. In addition to the efficiency of the Star burner, as disclosed under Edinburgh conditions, cheapness of renewals has also been taken into consideration arriving at a conclusion. The lantern to be employed in the new scheme of lighting is here illustrated. The body is of copper, with enamelled earthenware reflector and cone. A special lighting arrangement is introduced. The lamp-lighter turns the tap half on, and, with his torch, lights the flash-jet, which, in turn, lights the gas at the burner. When he withdraws his torch, he again touches the lever, turning the gas supply off from the flash-jet and full on to the burner. Referring to our illustration, A is the special cock with bye-pass to flash-light; B is the burner, C the flash-light; D the earthenware reflector, and E the copper cone. These lamps give a downward light of 70 candle power, on a consumption of  $2\frac{1}{2}$  cubic feet per hour. From the report issued by the experts who advised the Edinburgh Corporation, we have no hesitation in recommending these lanterns for street lighting and similar purposes. Full particulars, and special quotations can be had from the Star Inverted Incandescent Burner Company, Limited, 104 and 105 Great Saffron Hill, London, E.C.

Lord Rosebery, speaking in Glasgow, on behalf of the Auld Brig o' Ayr Preservation Scheme, said he came there as a "Jolly Beggars." If they did not save the Auld Brig an American millionaire would have all the stones numbered, and rebuilt in his backyard in Chicago.

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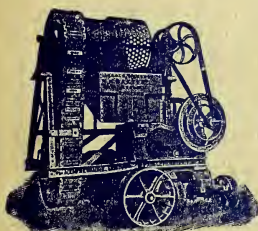
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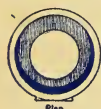
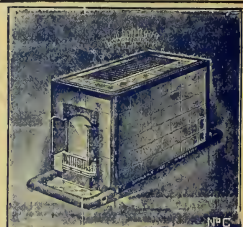
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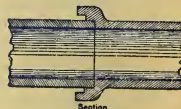
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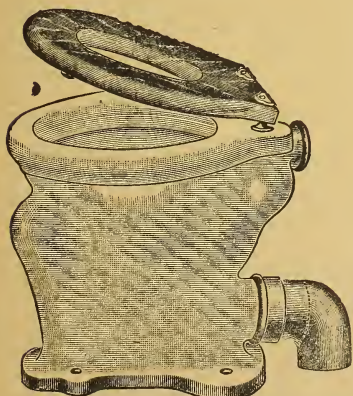
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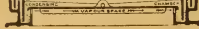
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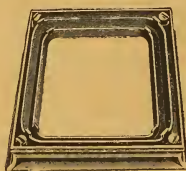
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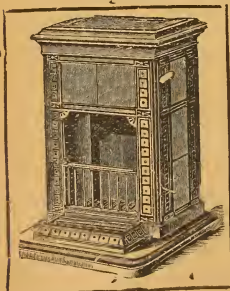
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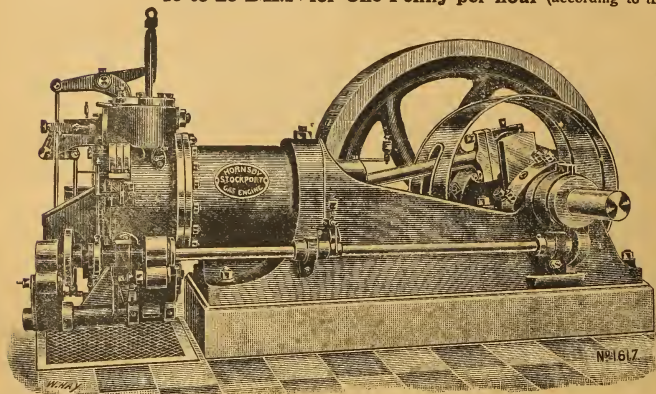
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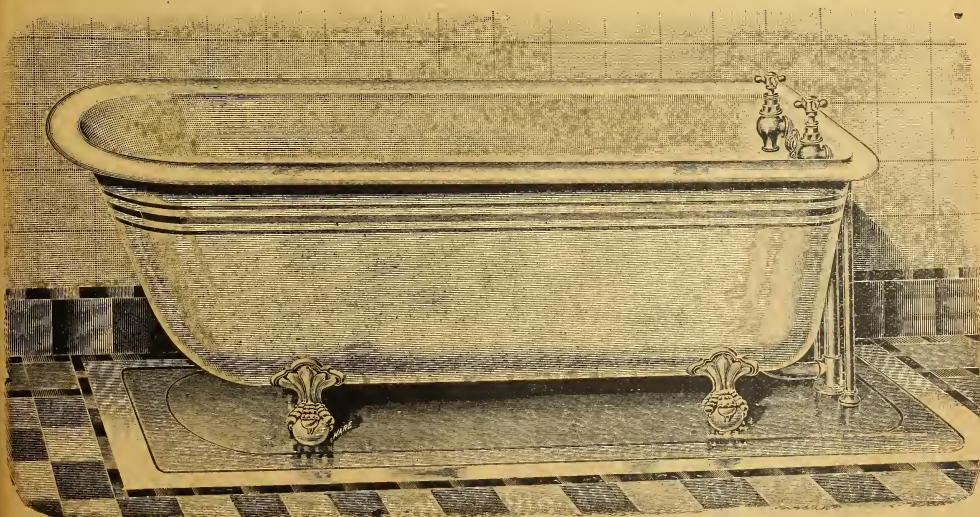
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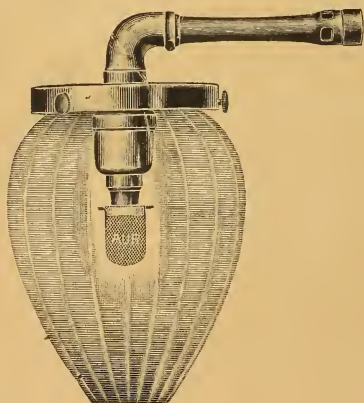
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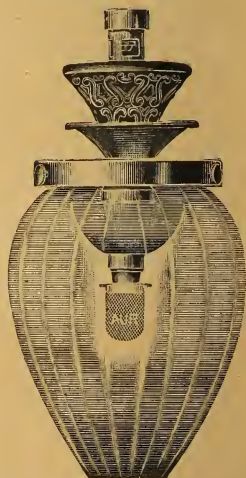
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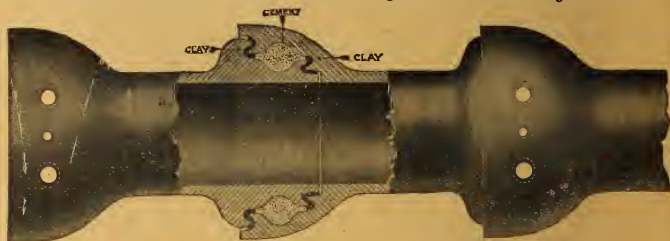
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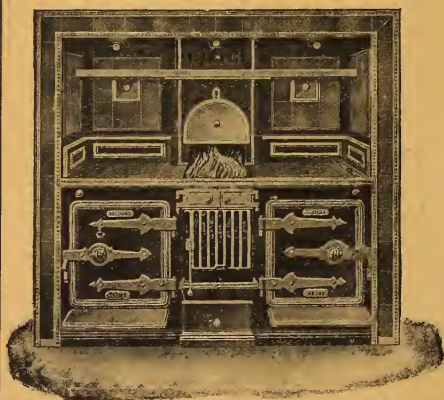
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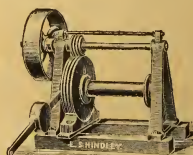
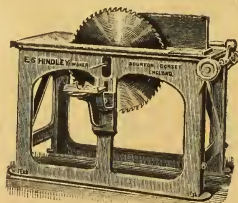
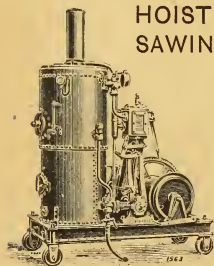
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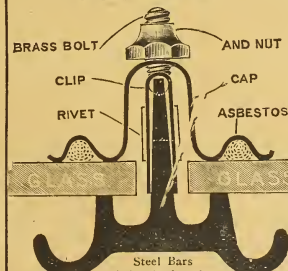
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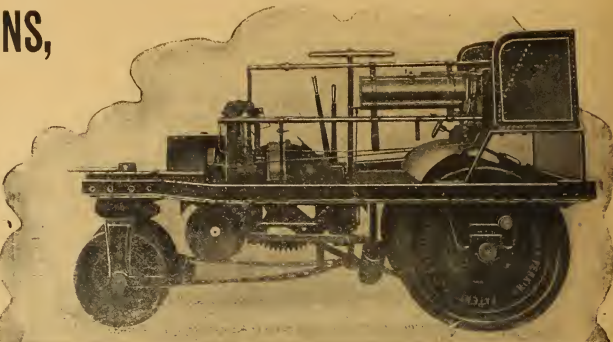
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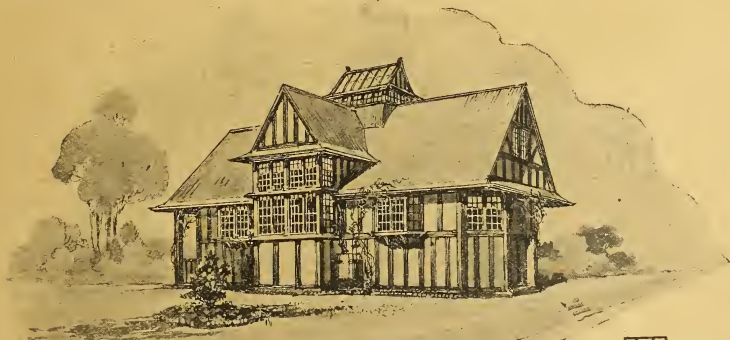
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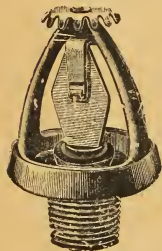
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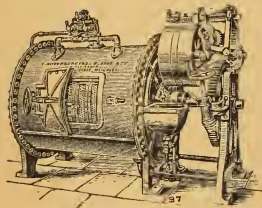
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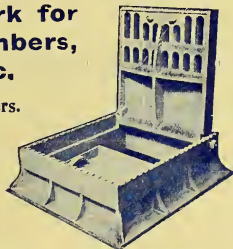
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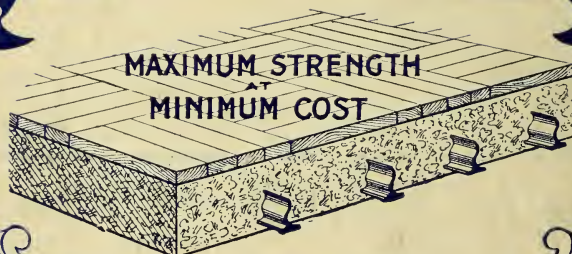
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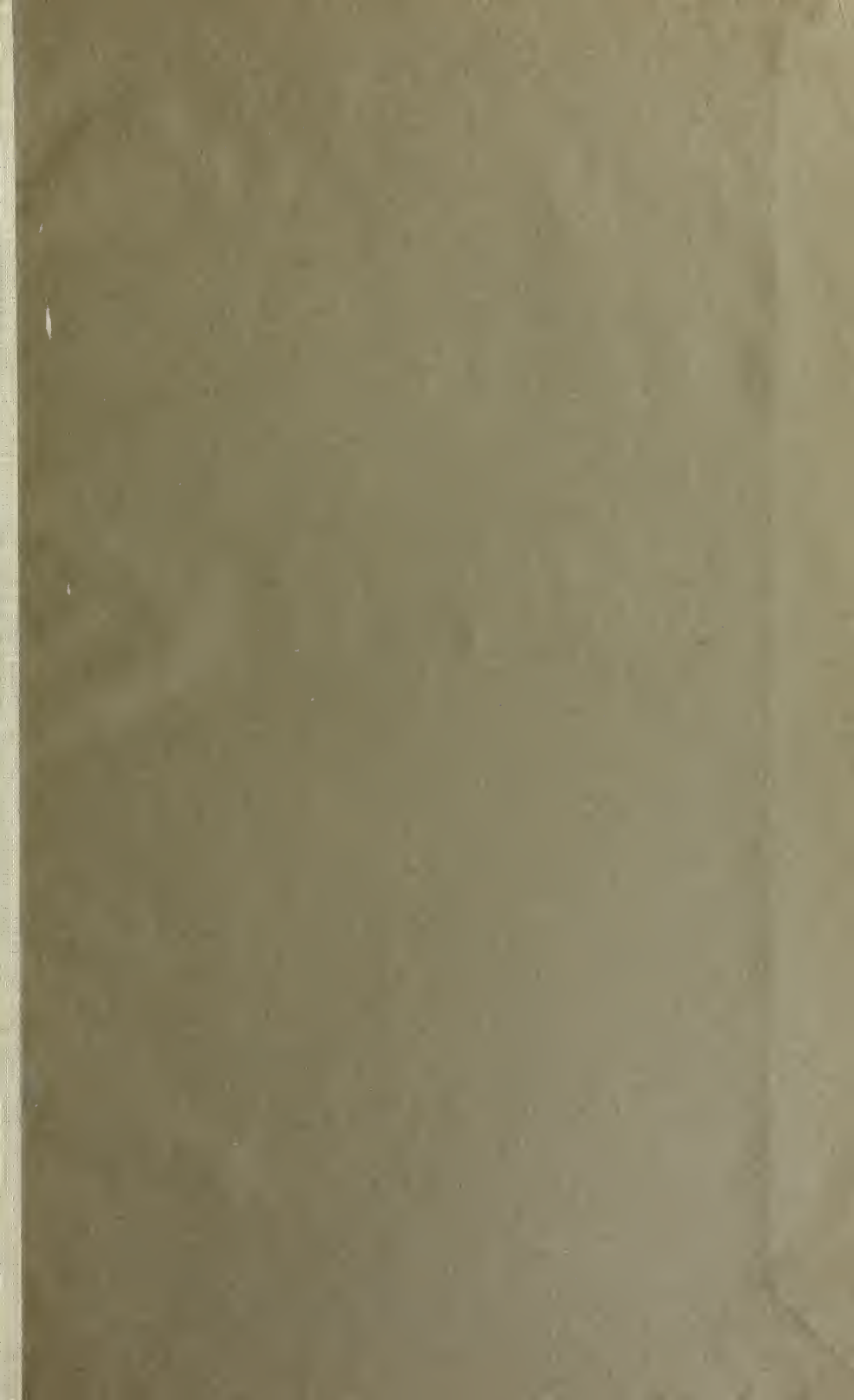
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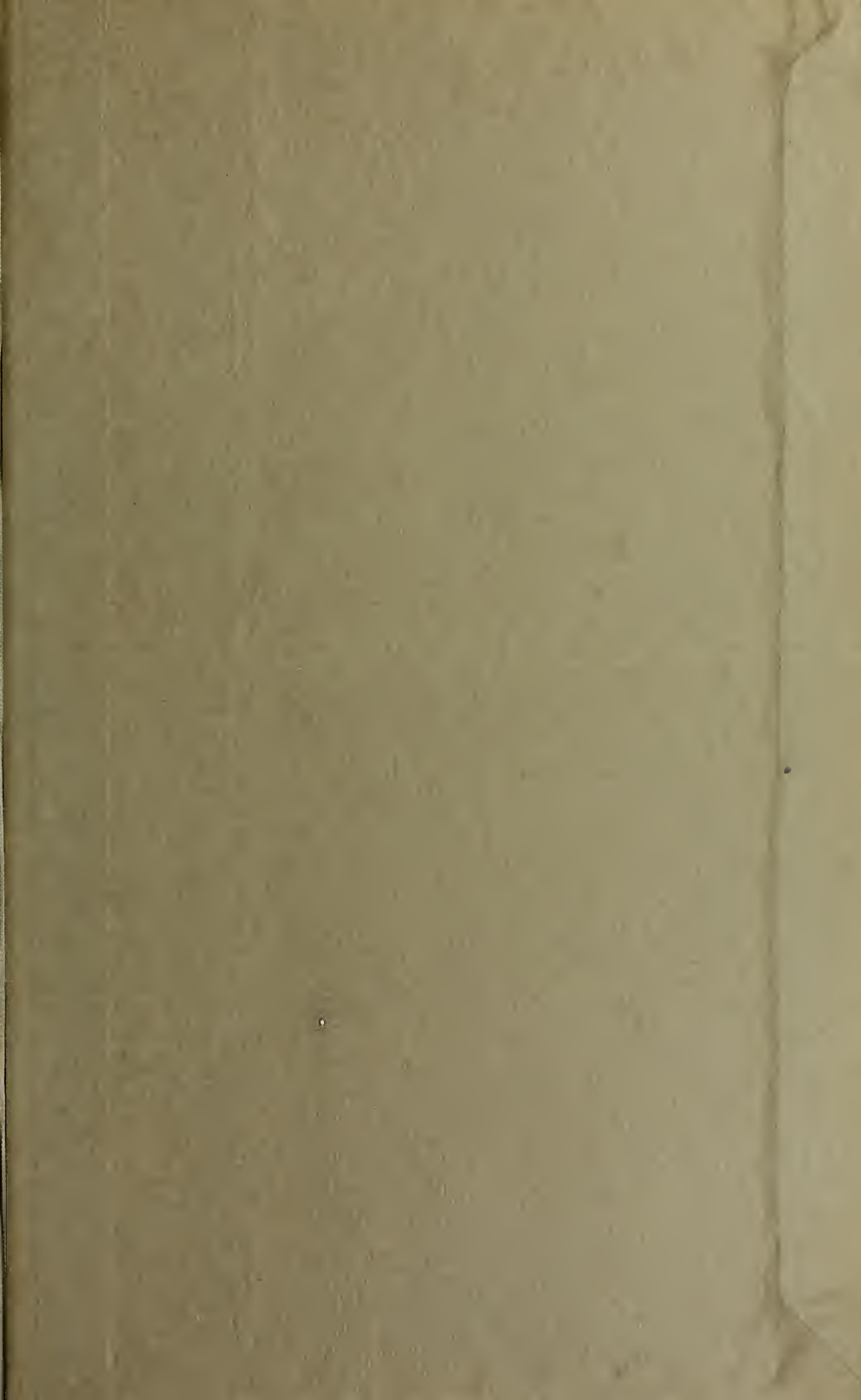














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